A CHILTON PUBLICATION

the Iron Age

THE NATIONAL METALWORKING WEEKLY

September 3, 1953

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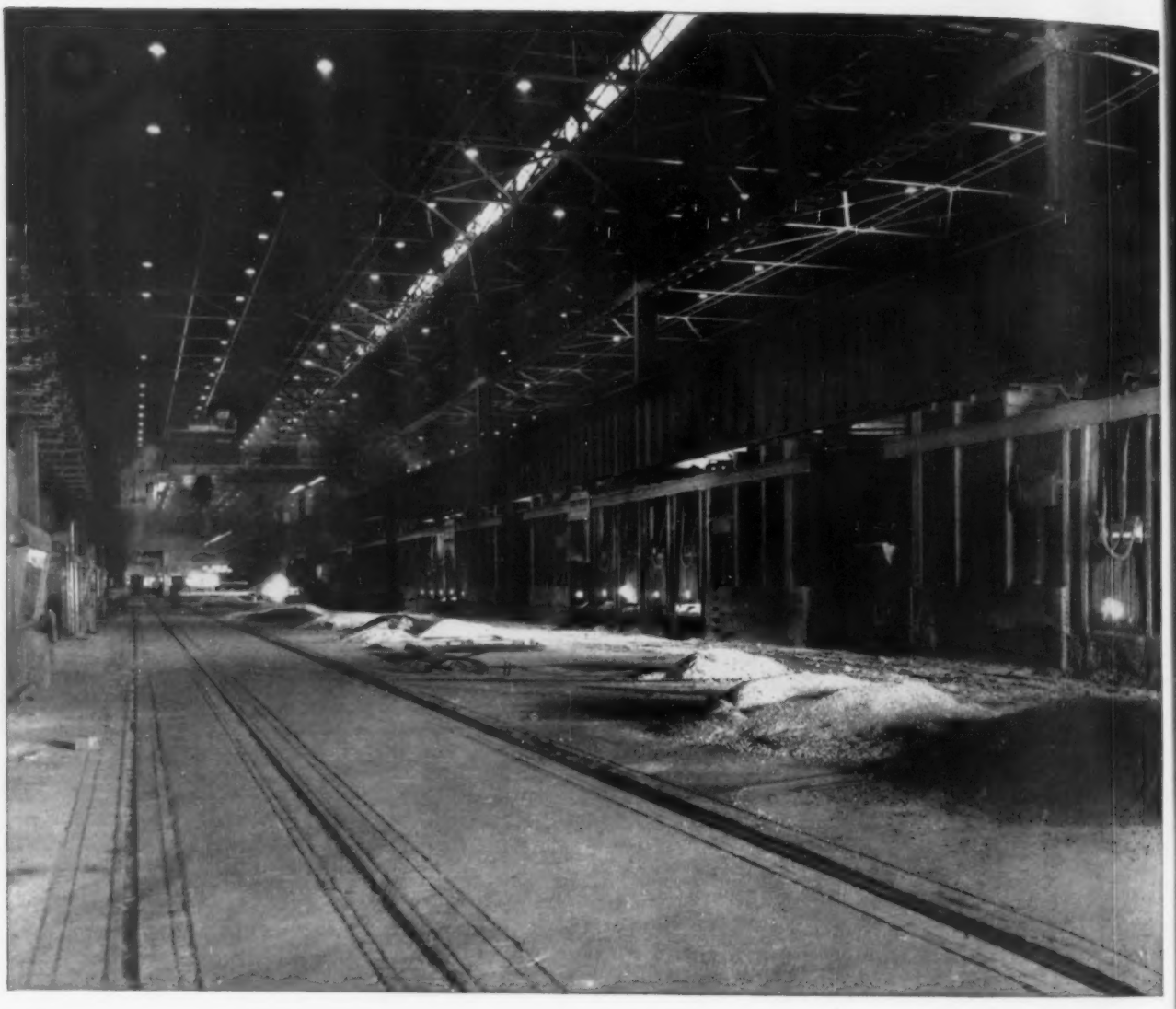

Ramset bottoms* installed in new open hearths at Youngstown's Indiana Harbor Works

YOUNGSTOWN Sheet and Tube is making steel on Ramset bottoms in its new open hearth shop at the Indiana Harbor Works.

A majority of the bottoms installed in new open hearth shops in the past several years are of rammed construction—and of these hearths, Ramset installations hold a 2 to 1 advantage over any other magnesia ramming mix.

Basic Refractories pioneered the development of rammed hearth methods nearly fifteen years ago. These methods have been continually refined over the intervening years by the practical steelmakers who make up Basic's sales and service staff. A few years ago, Basic supplemented this advanced technique by making available mixing, conveying and compacting equipment specifically designed for the job.

So, in selecting Ramset, a steelmaker avails himself of a proven refractory and the most modern methods and equipment for installing it, as well as of the services of Basic personnel who, by background and training, are skilled in the use of granular basic refractories.

*Surfaced with grain magnesite

Basic Refractories Incorporated 845 HANNA BUILDING, CLEVELAND 15, OHIO

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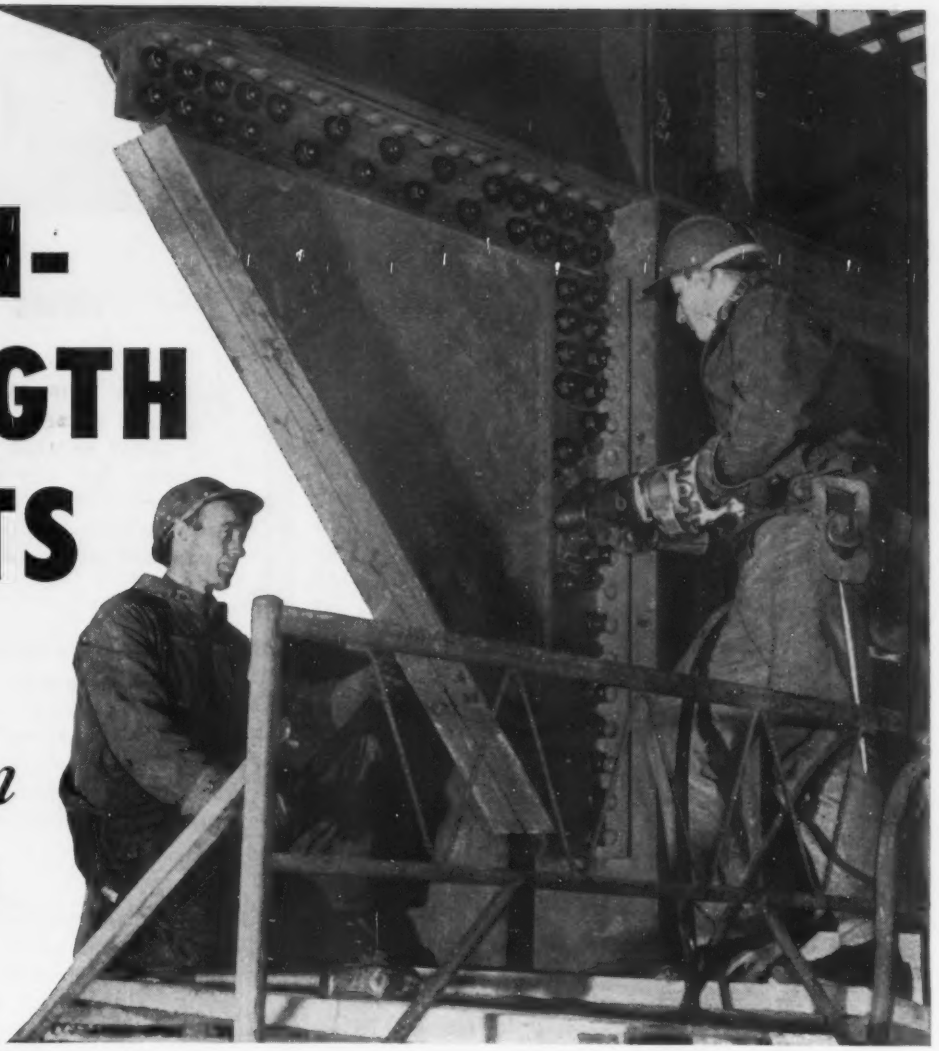
HIGH-STRENGTH BOLTS

Save Erection Time



Erection of steelwork can be accomplished in less time when you use Bethlehem High-Strength Bolts to join the structural members.

Used in place of field-driven rivets, Bethlehem High-Strength Bolts are installed by a crew of only two men. One man operates an impact wrench, the other a holding wrench. No other tools are needed.

In installing these high-strength bolts, two hardened washers are placed on each bolt, one washer going under the head, the other under the hexagonal nut. This makes possible the development of maximum clamping force, without deforming the connected material.

Where the bolts pass through beam- or channel-flanges having a sloping inner face, a bevel washer provides a square seat for the bolt head or nut. The bevel washer is made in two types, for use with wide-flange beams and with standard beams or channels.

Bethlehem High-Strength Bolts are made at our fasteners plant at Lebanon, Pa. They are heat-treated by quenching and tempering, to meet the requirements of ASTM Specification A-325.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
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BETHLEHEM STEEL

New Booklet on Bolted Construction

We've just issued a 16-page booklet, "High-Strength Bolting for Structural Joints," giving detailed technical information about the advantages of high-strength bolts in erecting steelwork. Two colors, illustrated. If you would like to have a copy, write to Publications Dept., Room 1039, Bethlehem Steel Company, Bethlehem, Pa.

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The Iron Age

Vol. 172, No. 10, September 3, 1953

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THE IRON AGE, published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, $15, other Foreign Countries, $25 per year. Single copies, 35¢. Annual Review and Metal Industry Facts Issue, $2.00. Cables: "Ironage," N. Y.

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DIGEST of t

NEWS DEVELOPMENTS

LAKE ORE SHIPMENTS HEAD FOR NEW PEAK—P. 58
Steel mill storage capacity is expected to be the limiting factor on 1953 Great Lakes iron ore shipments. Shippers feel they could move 103 million tons but will probably ship "only 100 million." Many foresee a very early end to the season. Bigger, faster oreboats get credit for top notch performance.

PRIVATE FIRMS TAKE ON ZIRCONIUM OUTPUT—P. 61
With encouragement from Atomic Energy Commission, private industry is gradually taking over production of hafnium-free zirconium from the government. Carborundum Metals is producing sponge, Allegheny Ludlum is casting ingots. Other firms are wanted. High prices limit civilian applications.

WEST COAST PLANE OUTPUT KEEPS ALTITUDE—P. 63
Western planemakers are continuing their full throttle operations. There has been no major rescheduling of military production as yet. Increased civilian production is planned. Total western plane backlog is now about $75 billion or 2 years. Defense cuts will probably hit guided missiles, helicopters hardest.

AUTOMAKERS STEP UP MECHANIC TRAINING — P. 72
Automobile manufacturers, faced with a growing shortage of properly trained service station mechanics, are pushing training programs, trying to attract more and better qualified men. Training methods vary from company to company, but all emphasize new model changes. Some feel training programs are overdue.

WILL END DISTRESS AREA BID PREFERENCE — P. 77
Government contracts from here on are to be awarded only to low bidders. Manufacturers in labor-surplus area will no longer be permitted to match low bidders from other areas. It's not official yet and Office of Defense Mobilization is feeling plenty of pressure from distress area congressmen.

FINISHING COSTS SPREAD USE OF TUMBLING — P. 83
High finishing costs are focusing increased attention on the tumbling of precision-made parts to remove sharp edges, and burrs. Some aircraft engine manufacturers are now tumbling major engine components on a production basis. Special fixtures have to be built in order to tumble large parts that cannot be tumbled loose.

the Week in Metalworking

ENGINEERING & PRODUCTION

NONCORROSIVE FLUX AIDS SOLDERING — P. 115
Aluminum and other metals can now be soldered reliably, easily and safely using a series of new fluxes. They remove oxides and other interfering films from aluminum, and solder-spreading action is twice as good as that of zinc chloride on copper. It is applied either as water solution or paste.

STRETCH WRAPPING PROVES LESS COSTLY — P. 120
The aircraft industry's need for a less costly way of forming large sheet metal, extrusion and brake or roll-formed sections, led to wider acceptance of stretch wrap forming. Secret of method is the yield strength attained by stretching and setting the metal beyond its original yield strength.

SPECIAL FIXTURES SPEED LATHE OPERATIONS—P. 125
New production setup permits turning of three axle shaft forgings at a time in automatic lathes. Turning is completed in one fast cycle. Work rotates at two different speeds. High precision with less labor, fewer machines and fewer grinding operations are important features. Work handling is reduced.

PART NEEDS DETERMINE CASTING METHOD — P. 128
Precision, smoothness and uniformity in the three basic investment techniques depend on pattern material. Surfaces of sand shell mold castings are nearly as good as those of as-cast investment castings. Average investment runs are less than 10,000 but runs of 100,000 are common.

NEXT WEEK—PLASTIC ALLOYS FOR LOW-COST FINISH
Vinyl plastic coatings are used for an increasing number of applications to replace highly alloyed ferrous and nonferrous alloys. Outstanding resistance to corrosion, remarkable toughness and resiliency are characteristic properties. New dipping techniques and formulations have expanded their use.

NEXT WEEK—ALUMINUM MAKES A BETTER BEARING
Aluminum alloys have proved to be a good bearing material for rolling mills and rolling mill equipment. Two alloys were tested extensively over a 6-year period. Solid aluminum bearing bushings performed satisfactorily at much higher operating temperatures than softer materials.

MARKETS & PRICES

THE BOOM WILL EASE, PROSPERITY TO STAY — P. 55
Thirteen dominant steel and metalworking industries respond to an Iron Age survey with a vote of confidence in continuing production prosperity despite an easing in the boom, slightly lower output rates. Top level executives calculated that there was still abundant room for good profits, prosperity.

SICK SCRAP MARKET SHOWS NO IMPROVEMENT—P. 59
Scrap's sickness is not yet critical but aloofness of the doctor, steel mill buyer, and doses of self-administered pessimism have kindled a high fever of apprehension. The Iron Age Scrap Steel Composite Price has tumbled. Watch the steel industry's operating rates to keep your finger on scrap's pulse.

TRADE RISE SHOWS WEST GERMAN RECOVERY—P. 62
Since 1946 West German exports have climbed from $206 million to more than $4 billion per year. Last year marked return to a favorable trade balance. Indications are that dramatic phase of West Germany's resurgence from postwar oblivion may be over. May do more business with countries in the Middle East.

SHIPBUILDERS MAN THEIR BATTLE STATIONS — P. 66
Log book of new shipbuilding business is blank—with no orders seen since November. Some 31 ships are to be delivered this year, leaving only 38 still under construction. Builders could use overhaul and repair work. But without new orders, warns Eugene Grace, there will be no U. S. shipbuilding by 1955.

CONSUMER IS KINGPIN IN U. S. ECONOMY — P. 85
Numbering 160 million, consumers determine the trend of your business graph. To keep that graph slanting upward study this buyer. Know what he spends and the how and why behind that spending. This week's Report to Management gives valuable statistics on what the consumer does with his purchasing power.

RECOMMEND U.S. BUY CHILEAN COPPER STOCK—P. 160
Defense Mobilization Board last week recommended that the State Dept. negotiate for Chile's 84,000-ton copper surplus. This move followed shortly after Chile's announcement that it would sell its copper to the Reds if the U. S. doesn't buy it. Several other considerations make this a very sticky issue.

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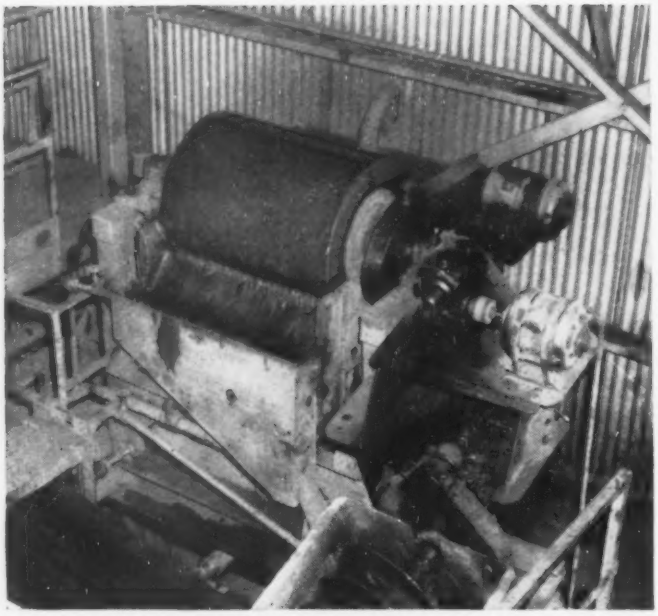
New Horizons in . . .

MAGNETIC SEPARATION



Installation of Jeffrey Magnetic Drum Separator in a Heavy Media plant treating iron ore.

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— is *pioneering* continuously in the modernization of wet magnetic separation processes.

— is *promoting* exclusively drum-type separators, simple, efficient, compact, dependable.

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— *originated* Counter-flow units for the ultimate in recovery of magnetic medium in Heavy Media and Cyclone processes.

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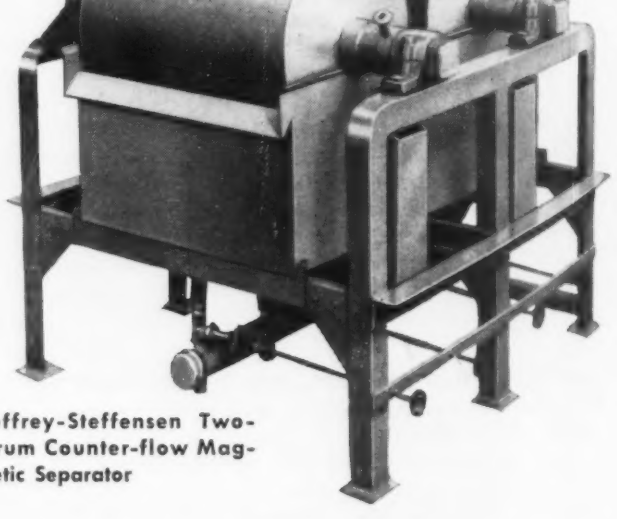

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Stuff For Daydreaming

SOME time ago a company and a union signed a contract to give employees their birthdays off with pay. That sure is jim-dandy. It is some kind of a millennium.

It gives us some nice stuff for daydreaming. Think what the next step will be. Can't you see the shop steward coming in soon with some new and terrific ideas on days off with pay.

Maybe all those who are married—happily or otherwise—could have their anniversaries off with pay. They could let the housework and the job go and have a full good day of it; or they could spend the day arguing about the respective merits of each other's relatives.

But hold it, there is a catch. How about the bachelors or bachelor girls? What can we do for them? That may be a tough one for the union steward. Perhaps all those who are not married should be given the day off that commemorates when each was "turned down." Or maybe commemorate the day they found out just in time not to take the plunge. The main idea is to get the day off with pay.

As things roll along each employee gets his boy's or girl's birthday off. That would really be merited. It is well known that fathers suffer more than mothers do. Those with the most kids would, of course, get the most days off.

How about those with no children? They would be out of luck. If that were the case there might be dissension in the rank and file. To counter this, those who had no children should get a paid holiday celebrating their sister's or brother's birthday. If they were an only child and still not married . . . well, we can't have everything.

If we run out of ideas we can always get time off for the day we got a raise. This means that by now there will be no one left in the plant except those who never married, or had no brothers or sisters, or received no raise.

As a final day off we could get paid for the day most of the bosses dropped dead because there was no one left to do the work.

Tom Campbell

Editor

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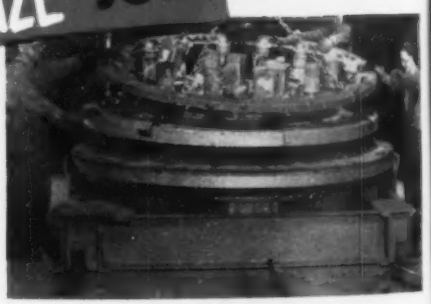
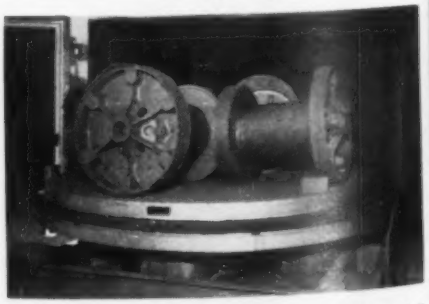
KING SIZE
CLEANING PERFORMANCE
ON A KING SIZE JOB



ABOVE: Loading and unloading time is materially reduced through use of auxiliary tables. One auxiliary table can be loaded while the other is in the cabinet being cleaned.

BELOW: Cleaning winch hoist drums in the Wheelabrator Car-type Room.



WHEELABRATOR ® ROOM cleans castings weighing from 1 to 20,000 lbs. each

A reduction of 32 man hours in direct cleaning room labor and a drastic slash in the cost of chipping and grinding were immediate results of the installation of this Wheelabrator Car-Type Room at AMERICAN HOIST & DERRICK CO., St. Paul, Minnesota. Every steel and gray iron casting produced in the plant is Wheelabrated. . . . large castings weigh as much as 10 tons, while the smallest weighs less than one pound. Cleaning is accomplished in a fraction of the time required by the airblasting method previously used. For example, six large cable drums that are now Wheelabrated in five minutes would have taken more than an hour to clean by airblasting. You get king-size cleaning performance on any size job with a Wheelabrator. Send for full details today.

Catalog 74-B explains the advantages of Wheelabrating and describes typical Wheelabrator Machines. Send today for a copy.

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Dear Editor:

Letters from readers

A Foreman Speaks Out

Sir:

Your editorials are excellent. If you have reprints of your August 13th one, would you please mail four or five copies to me?

E. W. ALLEN
Asst. Chief Engineer

General Motors Corp.
Truck & Coach Div.
Pontiac, Mich.

Sir:

I have noted your editorial "A Foreman Speaks Out" in the August 13th issue and find it very interesting. If available, I would appreciate receiving six reprints.

J. F. JONES
Factory Manager

Hudson Motor Car Co.
Detroit, Mich.

A few reprints are still available.—Ed.

Jaeger Sheet Lifter

Sir:

The description of our self-opening and closing sheet lifter, which you published in your August 6th issue under the heading "Technical Briefs," neglected to state that it is manufactured by the Jaeger Machine Co., Columbus 16, Ohio.

Would you please call this fact to your readers' attention?

W. L. WOLFE
Executive Assistant

The Jaeger Machine Co.
Columbus, Ohio

Sorry, we inadvertently omitted name and address. Thank you for calling this to our attention.—Ed.

Titanium Carbides

Sir:

In reviewing my article "Sintered Titanium Carbides Open New Industrial Horizons" in the August 13th issue, I have observed an error in one of the figures. Fig. No. 2, on p. 149, should have impact strength listed in values of ft-lb rather than in.-lb. The ft-lb range is used on our unnotched Charpy type of specimen.

The error came about due to the fact that we were also working on impact specimens 3/16 x 3/16 x 1½ in., the impact values of which are determined on a small modified plastic impact machine in terms of in.-lb.

Would you please correct this erratum in a suitable manner?

JOHN W. GRAHAM
Research Engineer

Kennametal, Inc.
Latrobe, Pa.

Report to Management

Sir:

Can you send me 25 copies of the Report to Management from your August 20th issue?

It is one of the best things I have seen. I want all of our young (and old) men to have it to read.

H SEARS HOYT
Partner

A. Milne & Co.
New York, N. Y.

Stamping Production Speeded

Sir:

We found your article "New Setups Speed Production of Stampings" in the August 13th issue very interesting and would appreciate your advising the manufacturer of the V & O Feed-O-Matic.

B. C. BOARD
Purchasing Agent

The Fletcher Enamel Co.
Dunbar, West Virginia

The V & O Feed-O-Matic is a product of the V & O Press Co., Hudson, N. Y.—Ed.

Handbook of Terms

Sir:

An article compiled by the U. S. Steel Company, which appeared in the March 12th issue, has attracted a considerable amount of attention here at Reliance. We would like very much to have two reprints of this article entitled "Handbook of Terms Commonly Used in the Steel Industry."

K. F. ERTELL
Advertising Manager

Reliance Electric & Engr. Co.
Cleveland, Ohio

Sir:

If they are now available, we should like very much to have four copies of the "Handbook of Terms Commonly Used in the Steel Industry."

JEAN P. WESNER
Librarian

Bethlehem Steel Co.
Bethlehem, Pa.

Aluminum Powder

Sir.

With reference to the August 20th issue, please forward further information on "aluminum powder in a special plastic vehicle" as described on your Newsfront page.

JOSEPH E. BERMAN
President

Industrial Metal Protectives, Inc.
Dayton, Ohio

Further information about this item may be obtained by writing the Emjay Maintenance Engineers, Inc., 327 Union Ave., Rutherford, N. J.—Ed.

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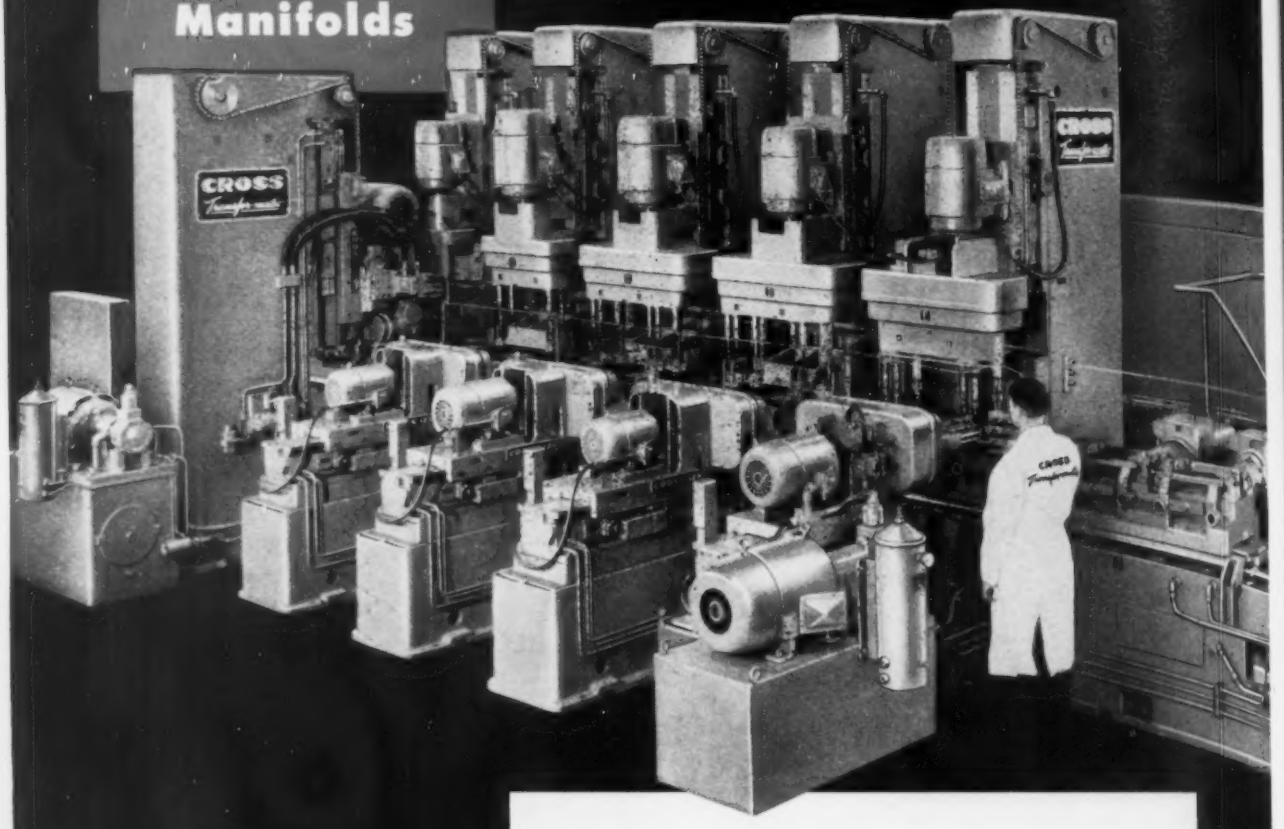

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Special MACHINE TOOLS

Fatigue Cracks

by William M. Coffey

The Postum Report

A great many women in the United States are married to men who subscribe to THE IRON AGE.

Sunk

We've told terrible jokes, we've insulted the editor and half the staff, we've played hooky, misspelled words, misquoted people, made enemies, never turned our copy in on time, always made it too long or too short—all in an effort to prove to the publisher that he was way off the track when he assigned this column to us. We were making good headway with this project when what happens? *We get a request for a reprint.*

This is a very serious setback and it has us sick in bed with fear, because we've worked hard to make this column sloppy, and overnight it can all go to waste for one lousy reprint. You see, requests for reprints are an old standby measure of editorial quality in the publishing field. Lots of requests indicate a good, lively, pace-setting editorial job. Needless to say, our editorial side is swarmed with such requests. Witness the over 290,000 requests for 92 separate articles published only since January 1st. You no doubt recall *Alloys—Conserve Now —Be Safe in War*—2,000 reprints. Or *Automation Cuts Forging Costs* —15,000 reprints. Or *Stainless Steel Parts Reduce Maintenance Costs*—5,000 reprints. Or *Beryllium Copper Spot Welded*—3,000. Or *The Case of the Cross-Eyed Waif*—10,000 reprints. And this doesn't even include the thousands and thousands of requests for the Titanium series which won us first prize in the country for editorial excellence, or the now-famous Handbook of Terms, or Tom Campbell's editorials which regularly ring the reprint bell.

All very splendid for the editorial people. But why pick on us? Incidentally, the Fatigue Cracks reprint request was for a poem (?) printed some months ago that started like this: *"We'll begin with box, the plural is boxes, But the plural of ox is oxen, not oxes; One fowl is a goose, but two are called geese, Yet the plural of moose is never meese . . ."* This didn't even come from us anyway; it came from the Colorado Fuel & Iron Works' *Blast*. Wished we'd never printed it.

Get Rich Quick

We have started many different departments—few of which have been repeated or recognized — but here's another new one, the "How To Get Rich Department."

To introduce it, we will quote from an advertisement, which must be public property—so please nobody sue—currently running for Warner & Swasey, manufacturers of machine tools, textile machinery and construction machinery. Being up to our ears in the circulation end of your ffj, it hits close to home. To wit:

> **"The government will carry a letter for you from Texas, say, to New York for 3¢. But the government loses money on the trip, and you have to pay taxes to make up the difference.**
>
> **Business carries a gallon of gasoline the same journey from Texas to New York for 1/5 of 3¢, does it almost as fast. It may not be door to door delivery, but it's a lot harder to handle, in spite of which business makes a profit—and out of which it pays taxes to support government business ventures such as the post office.**
>
> **Since time began, the hope of private profit is what has stimulated the drive for efficiency and low costs, out of which everyone benefits. If that is business selfishness, the world needs more of it."**

This is close to home to us, for we're the guy that has to explain to the publisher the inevitable increase in postage rates for mailing your ffj. It may come as a surprise to you, but an awful lot of your subscription rate goes for just postage. SO, if you want to make a million start a private postal service.

Puzzlers

Here are some more people who figured the engineer's name was Smith: Paul A. Tackett, Jack Karls, Helen Hines, Harold A. Ley and Alfred Morel. And some more winners of the pigs, cows and chickens puzzler: Eugene Brooks, John Cowell, B. B. Coulter and Edgar Lagonoff.

Here's a riddle attributed to Euclid that comes from Louis F. Galzi: A mule and a donkey were walking along, laden with corn. The mule said to the donkey, "If you gave me one measure, I should carry twice as much as you. If I gave you one, we should both carry equal burdens." What were the burdens?

let's talk turkey

about a prime source for

CUSTOM ALUMINUM EXTRUSIONS and ROLL FORMED SHAPES

The R. D. Werner Company may be your ideal supplier because...

We're big enough

to handle the largest job. We have the know-how and the most modern production equipment in the world for producing custom aluminum extrusions and roll formed shapes...also T4, T6 heat treating equipment.

We're small enough

to handle even modest assignments with the care and individual attention you want them to have.

We're alert enough

to meet delivery dates promptly realizing that SERVICE is part of our job. It's one *big* reason why our customer list grows every day.

Try us and see if you don't like the way we serve you—phone MU 6-2595 to discuss your particular requirements...or write

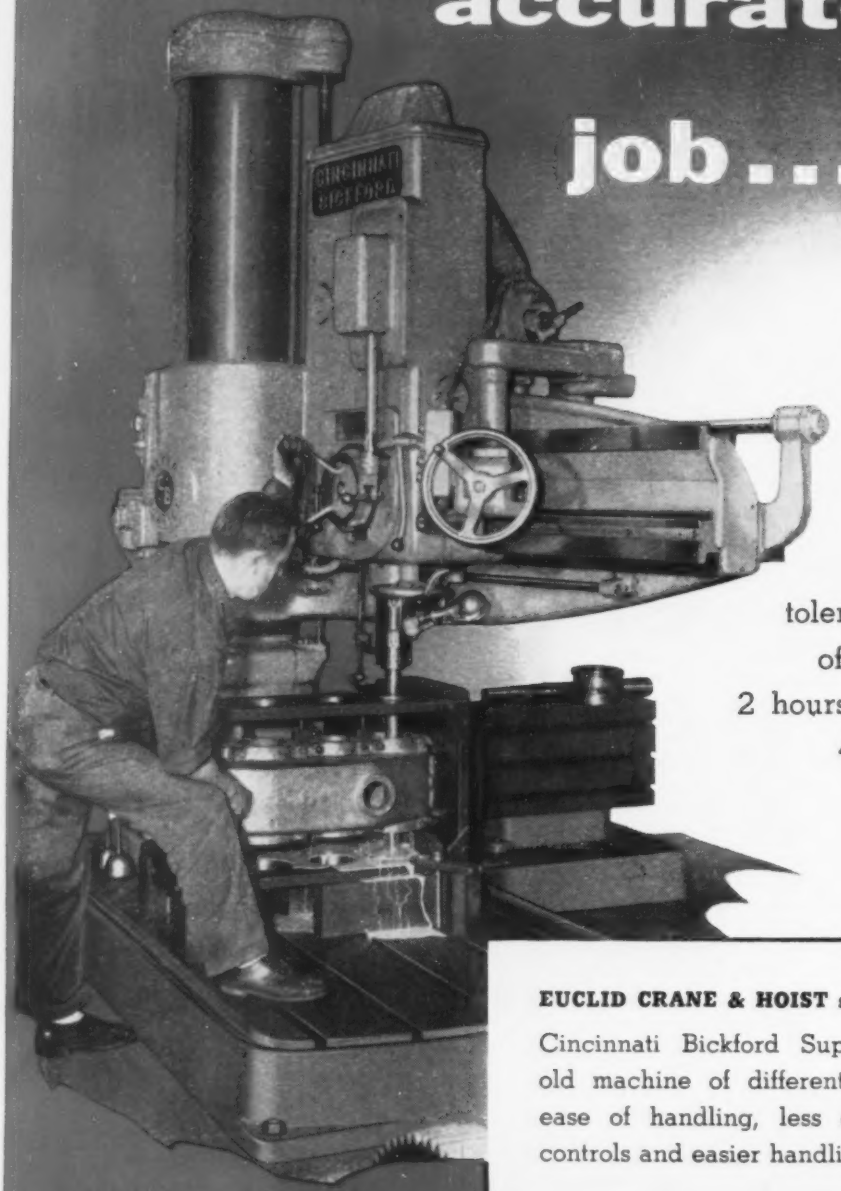
R. D. Werner Company, Inc. Dept. I-2
295 Fifth Ave., New York 16, N. Y.

Werner ALUMINUM

Custom Extrusion and Roll Forming
Aluminum or Stainless Steel

doubling production...

on this big, accurate job...



Here is another example of the accuracy and productivity of Cincinnati Bickford Super Service Radial Drills. Holes of 4.750" and 6.250" diameters are bored and held to .001" tolerances in this steel casting. Time of operations was reduced from 2 hours and 30 minutes to 1 hour and 40 minutes—practically doubling speed of production.

Write for Booklet R-29.

EUCLID CRANE & HOIST says:

Cincinnati Bickford Super Service Radial "replaced an old machine of different make—machine brought greater ease of handling, less operation fatigue thru convenient controls and easier handling."

Photos courtesy of The Euclid Crane & Hoist Co., manufacturers of Overhead Traveling Cranes.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio U.S.A.

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the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

FAILURE DUE TO GALVANIC ACTION between steel bolts and aluminum nuts on aircraft now appears to be much less of a problem than has been feared. Excellent results have been achieved by one leading plane maker. Now others are planning to follow suit, use aluminum nuts wherever possible. Watch for broader product lines by aluminum nut producers soon.

YOU MAY HAVE TO LEARN a new reaction in driving but you'll be better off for it. A trend toward putting brake pedals on the left in automatic transmission cars is developing. First stage will be pedals wide enough for either foot. Racing drivers know that a foot on the pedal cuts stopping distance.

A SECOND LOOK AT STEEL prospects for the fourth quarter has brought a slight dip in Lake ore shippers' estimates of this season's shipments. They now think season could end Nov. 15 with 103 million tons.

THE SILICA SAND upturn reported recently is being reflected in the cement industry. At least one major producer is well loaded with orders, is pushing for more output.

EXPLOSIVES USE BY STEEL INDUSTRY continues to grow, both for dismantlement of antedated equipment, and temporary shutdown. One mill finds it can reduce blast furnace downtime by 25 pct when removing burden with explosives, plans to expand its use.

NEW SYNTHETIC RESINS which will improve the impact strength and toughness of molded plastic products are being readied for the market. These products will aid in adaptation of plastics to industrial parts that require high impact strength. The resins are a white powder that can be made into sheets, rods or tubes by calendering or extruding.

AN ALLOY STEEL MAKER is producing hafnium-free zirconium on a commercial basis. Current capacity is 120,000 lb per year, but this may be increased within next 12 months. Virtually all production is going into atomic reactors.

LOOK FOR LESS AND LESS support from France for the European Army. The idea was conceived in France of French parents as a nice present to Washington. Now, in the face of rising German power, most Frenchmen are inclined to consider the child illegitimate.

TUNGSTEN ARC WELDS in arc-cast molybdenum sheet using unalloyed Mo filler are sound. But porosity is still present in welding powder metallurgy sheets and it takes about 20 pct thorium or zirconium to produce a weld relatively free of porosity. Molybdenum sheet is used for rockets, ram-jets, etc.

A SLIGHT DROP IN FEDERAL RESERVE index of industrial production (July was about 232 against 241 for June) comes as no surprise to some high ranking officials in Washington. Faced this spring with a choice of inflation v. deflation (it won't stay steady) they choose a little of the latter for their planning.

A NEW GAGE to automatically sort steel sheets in various sizes is now in the development stage. It will be designed to handle varying lengths and widths, sort them by gage into 20 different classes. Details are still under wraps.

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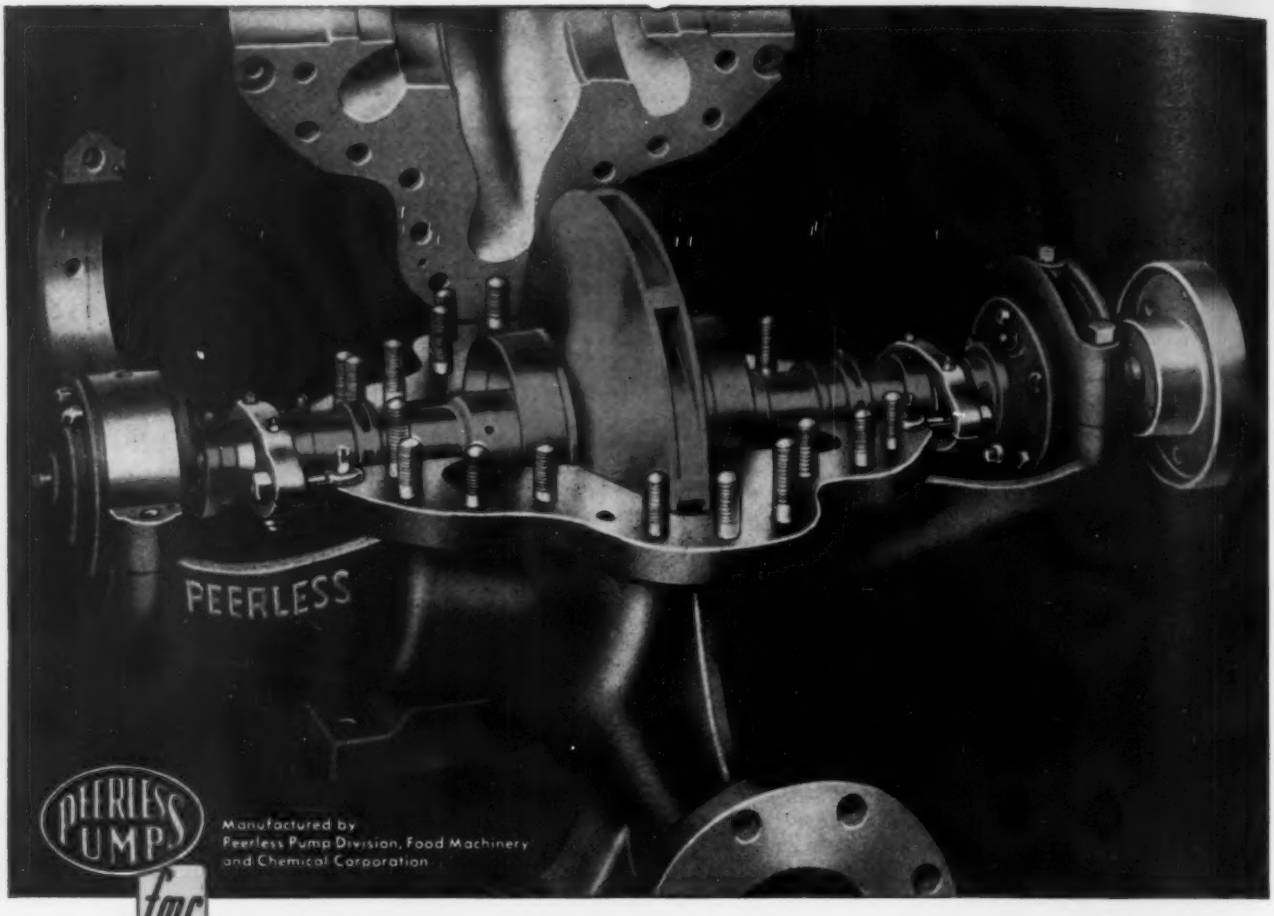


When fire strikes IT PUMPS PROTECTION

This is the heart of reliable systems that protect against hazards of fire

America's annual loss to the ravages of fire is a staggering amount. Reliable plant and property protection often begins with an independent fire protection system, the heart of which is an approved and reliable fire pump. In the manufacture of fire pumps, rigid construction requirements and operational dependability are paramount. This is why National Bearing Division was selected to supply bronze impellers, wearing rings, and shaft sleeves, for this fire pump and other pumps bearing the Peerless name.

In supplying component fire pump parts to Peerless, a supplier must not only meet the rigid requirements of this manufacturer, but also the strict regulations of Underwriters' Laboratories, Inc.; National Board of Fire Underwriters, Chicago; and the Inspection Department, Associated Factory Mutual Fire Insurance Companies, Boston.

National Bearing's proved ability to mass produce exceptionally fine-grained, non-ferrous castings, free from blow holes and sand inclusions, combined with Peerless Pump Division's exacting engineering and manufacturing standards help build fire pumps, and industrial pumps that can be counted to pump a reliable water supply for fire protection or other plant needs.

If your product requires non-ferrous castings or bearings, National Bearing Division has the foundry facilities, experience and skill that will insure better product performance and may possibly lower product costs.

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

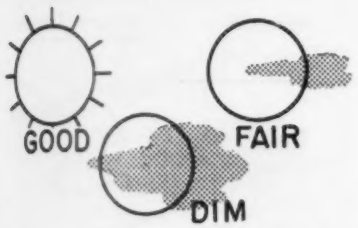
4923 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

INDUSTRY: Boom Eases, Prosperity Stays

Iron Age survey of 13 industries shows confidence in business outlook . . . Boom will ease, output turn down slightly . . . Nine industries rate Good, 2 Fair, only 2 Dim—*Staff Report.*

Weather Map for Industry



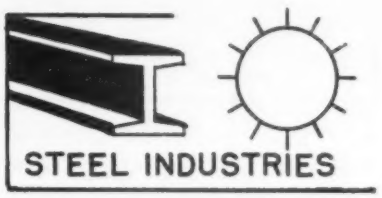
Thirteen dominant steel and metalworking industries responded to an IRON AGE survey with a vote of confidence in continuing production prosperity despite an easing in the boom and a consequent small decline in business volume. Top drawer executives calculated that a slight waning in sales and output next year would leave ample room for good profits and a more normal prosperity.

Recession, as far as the surveyed group was concerned, was a figment of the pessimistic economist's imagination. Of course, some industries regarded their outlook sourly but even in the dizziest of booms soft spots can be found. Overall, production will continue good, slightly off from record production maintained this year.

IRON AGE classified sales outlooks of nine of the 13 industries as *Good*, two as *Fair*, and two as *Dim*. Most industries earning the *Good* listing nevertheless expected a slight downturn of output but only to the extent that it signified a return to a more normal market.

Optimism in future business conditions however did not inspire rashness in any of the industries. A mild wave of inventory cutbacks affected a substantial part of the sampling and this clearly indicated caution, a bracing for come what may. Order backlogs were generally declining, partly because of industry's transition to shorter delivery time and purchasing to a competitive basis.

Honed up competition this year and next will prove an effective damper to price increases. Many executives saw the price trend as mildly down—not up. The important appliance and automotive industries intend holding the line on prices.

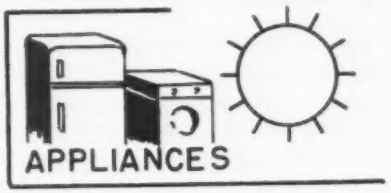


At IRON AGE's request, prominent steel men took the wraps off crystal balls to predict a moderate downturn in operations by year's end. While estimates hovered about 90 pct of capacity, some mills and products seemed certain to bear more of a decline than others.

A minority of mills predicted near capacity operations for the rest of 1953, one into the first quarter of '54. As for next year, consensus is that the rate will drift gently below 90 pct to a point of profitable production buoyed up by high-level manufacturing. Bottom estimates for '54 steelmaking were 85 pct of capacity.

U. S. Steel's president, Clifford F. Hood, told IRON AGE he expects business to continue good for the balance of the year. Merchant products in nearly all areas are in good supply, inventories not excessive. He blamed present reduced operations principally on vacations, not on easing demand.

Arthur V. Weible, president of Tennessee Coal & Iron, said his company will operate at full capacity for the rest of '53 and possibly for the rest of '54.



An accurate gage of prosperity, household appliance sales for first half '53 were at a record and though output may dip it will still be outstanding. For 1954 a high-buying first half is seen.

Order backlogs vary from "normal" to "well below 1952 and first half 1953." At least one producer reports dealer inventories sinking. Generally, the inventory situation is encouraging.

Raw materials inventories are well balanced, adequate in nearly all grades of steel. No major steel mill order cancellations reported but industry wants to shorten order lead time. Stockpiles, from 15 to 30 days, are being held there. Prices will be stable.

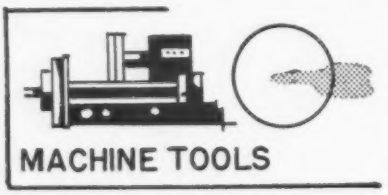
Westinghouse Electric Corp. told IRON AGE "outlook for 1953-54 is exceptionally good." A new plant at Columbus, Ohio, will start up in October, double output of refrigerators.

July '53 broke all records for Westinghouse's Mansfield, Ohio, appliance division, putting sales of electric housewares, electric blankets 103 pct over July '52. First 7 months' sales ran 47 pct over '52 and sales of major appliances are "very high."

Westinghouse finished product

stocks are "not excessive, in some cases below average."

An independent stove maker said 1953 volume is equal to or over last year while 1954 should see sales hold firm. Materials inventories, 25 pct above normal, are being slashed, particularly steel. Tougher competition will keep his prices unchanged in '54.



Machine tool builders show varying pessimism on sales outlook. Current shipments are high but order backlogs have been shaved by decline of defense orders to 7.4 months in July '53 from 13 months a year ago. Builders are braced to rely principally on civilian orders in 1954, will hold prices steady to meet competition.

Today, the industry has an unexpected flurry of orders resulting from the General Motors fire. One builder told IRON AGE 200 tools must be replaced, a greater number rebuilt.

Television set makers have about the same tone of optimism as a professor on a quiz giveaway program. Output this year may top 7.5 million sets against 6.1 million in '52. At the end of June, factory inventory of sets was 693,490, a figure that has since then been shaded. Stockpile is not seen as excessive but producers would like to cut.

First half boom production was bolstered by shipment of over 3 million sets to dealers, or 43 pct over the '52 period. A continuing stimulus to the industry will be starting of hundreds of new stations, opening new markets, sometimes doubling the old. A substantial replacement market is also shaping up. Future seems excellent.

Nonferrous Metals Trends

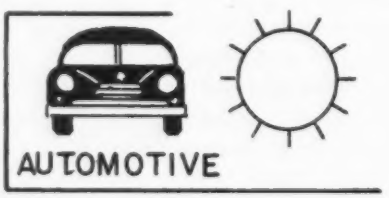
Aluminum . . . Still fairly tight but market will ease. Salesmen should be pushing in fourth quarter or early '54. Output climbs and third power-short year in a row is doubtful. Prices are steady.

Copper . . . Supply definitely exceeds demand. The Chilean surplus is large and may further overstock U. S. market. Prices may ease slightly.

Lead . . . Demand, especially from battery makers, is high and atomic energy uses are lead hungry. Prices expected to continue a gradual increase. Many supply contracts are now on average price basis.

Zinc . . . Supply is still more than ample despite cutback production. Demand may sink further but prices should stay steady.

Tin . . . Supply outstrips demand. Tinplate output will drop. Prices are weak, may drop further. Only a worsening international situation can jack up prices.



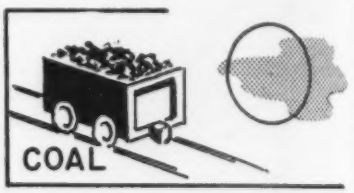
General Motors' transmission plant fire has smoked up the automotive production picture but the market will stay strong for the rest of '53, dipping to still high level in '54 to extent that boom plays out.

A premium will be placed on salesmanship as competition thrives and some car makers strive hard to clean up old models. Defense cutbacks in trucks, tanks worsen Detroit's outlook.

Most automakers are reducing inventory of materials to between 30 and 60 days, getting a smoother balance of steel stocks, shedding some overstocked items.

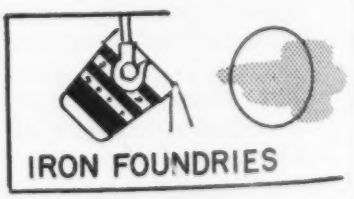
Prices? Now at their lowest except for some top models. Though GM and Ford are not frequently discounted, some other makes can be had for $100 over dealer price. No upward price trend seems possible.

Possibly reflecting tendency of industry to scale down truck purchases, output of trucks has been wobbly this year and since end of April has been lower than any recent year. No sharp improvement.



The coal industry's hopes for improving business remain underground. Two lusty competitors, gas and oil, hold considerable of coal's market and threaten with new beachheads as they expand.

Coal consumption, including exports, will reach about 445 million tons this year, probably decline to 420 million tons in 1954, dwindle to 400 million tons by 1955. In 1951, consumption was 534 million tons. Commercial coal prices have been beaten down by competition within a narrowing market.



Crying distress, gray iron and malleable foundries describe business prospects as being from "murky" to "miserable." Sales of gray iron foundries are down as much as 20 pct. Slowing of some customer industries, such as farm equipment, hardware, plus many living off inventory has aggravated situation.

Some founders claim operations at 50 pct of capacity. Raw materials are ample but high prices

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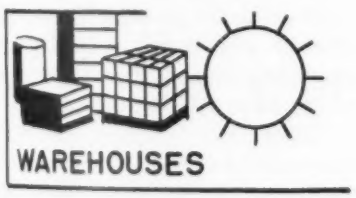
squeeze founders who dread effects of current wage negotiations. Materials stocks, normally 30 days, have spurted to as high as 45.

One founder told IRON AGE: "Our business stinks. Some business already on the books is held up because castings are not needed."

Cast iron pipe makers, after cutting to 40-hour week early this year, describe sales as adequate. They see a business easing but no drastic downturn. Prospects are good. No price changes.

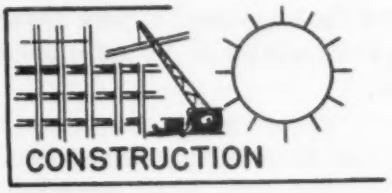
Planemaking on the West Coast, where most U. S. output is centered, is going on at full throttle. No major military cutbacks are scheduled as yet, and more civilian output is planned. Total western plane backlog is about $75 billion or 2 more good years.



Steel warehouse business has been running from 8-25 pct above last year for the first 7 months of '53. Sales volume is generally good with prospects for the rest of '53 and '54 seen as perhaps a smidge below the current rate.

Inventories, near normal, are much better balanced than ever since the Korean War. Structurals and plates are still tight although stocks are generally at October 1949 levels.

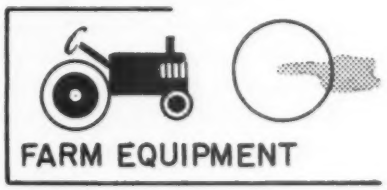
Some price cutting on certain alloy grades may crop up but solid business for 1954 should forestall widespread price slashing. As customers become more selective, so do warehouse men who no longer fill holes in racks with shorts and runovers. Warehouses have taken about 18.5 pct of steel output in the first half, will try to keep up the pace.



Construction industry order—backlogs are healthy though declining. Some firms report a skid in business, others are confident. Outlook for the second half of 1953 is for a gradually receding level of business and an upturn next spring. Competition is intensifying.

Shipments of fabricated structural steel from January through July were 19 pct over 1952. July shipments, although dropping 19 pct from June, were still 61 pct ahead of July 1952 when the steel strike was a factor. Order backlog at the end of July was 2,133,517 tons compared to 2,361,027 tons in 1952.

Inventories are fairly well-rounded, except for wide plate and wide flange beams. Steel deliveries are considerably improved. Prices should hold steady.

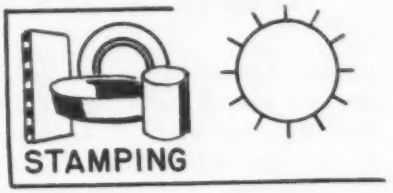


Spring is awaited by farm equipment makers to improve sales charts that have slipped in '53. For balance of year, a gradual decline is likely, as pointed up by plant layoffs, foundry cutbacks. Retailers reckon 1953 sales will be 5-10 pct below '52 and finished stocks 15-20 pct under last year's year-end high. Programs to cut materials, finished inventories are marked "urgent."

Tractor output has sickened. Overall sales are largely sustained by light equipment. One firm is now down to one-sixth of '52 tractor production.

Order backlogs are skimpy—below 1952's just-fair rate. Tractors have no backlogs.

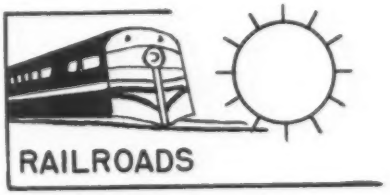
On materials stockpiles, one major firm will cut 20 pct while another expects to go as high as 30 pct.



Mainly because appliance, automotive customers had built up high stocks earlier, the stampings industry felt about 2-5 pct business retreat in second, third quarters. Customary Fall pickup does not have '52 steam. GM fire has dented some order books, cutting one plant 6 pct.

Before current mild slip, production was up an estimated 20 pct over similar period in '52. Since sales prospects of stampers are linked to success of appliance, auto fields, 1954 outlook is good. Many stampers see first half '54 as better than second half of '53.

With steel's easing, materials stocks are in fine balance. Inventory caution is noticeable and some firms cut on steel, copper. No important price trends up or down are detectable.



Railroad business will continue as good as business in general. Fourth quarter freight traffic should be a shade below 1952.

Backlogs of rail equipment orders have been heavily pruned, causing supplier concern. New car, locomotive orders are coming in somewhat reluctantly because roads want to be sure temporary freight rate hikes will be permanent before buying equipment.

Will freight rates rise? Labor contracts expire in October. If the unions win too high a boost, roads will seek another rate hike.

IRON ORE: See Record Year on Lakes

Many monthly highs expected to total new alltime record for Great Lakes shippers . . . Limit will be set by mills' ability to accept ore—By R. M. Lorz.

Great Lakes vessels are moving ore into Lower Lake ports faster than mills can store it. Last year at this time the talk was all about ore shortages. The fleet has already shipped 61,945,895 gross tons and it seems a certainty that last year's total movement of 74,910,798 tons will be surpassed.

At the halfway point in this shipping season long range forecasters were willing to bet that a new yearly tonnage record would be set. Comparisons with the record breaking war year of 1942 bear out their reasoning. By August of that year 47,357,672 tons were shipped to wartime steel producers who consumed 49,116,562 tons. This year shippers transported 50,555,082 tons by Aug. 1 and mills consumed 52,795,300 tons. Total shipped in 1942 was 92,076,781 tons.

Records Piling High

Since the fleet set sail in late March monthly tonnage records have been set with such frequency that vessel operators are predicting an early closing this season. Although mills are consuming ore at a terrific rate, Lake boats are keeping ahead of schedule. Some operators feel a total yearly tonnage of 103 million tons could be transported. Many don't believe that much will be hauled simply because many small independent mills couldn't accommodate the ore.

During the month of July vessel operators set an alltime monthly record by delivering 14,500,000 tons. In the same month mills consumed 8,200,000 tons. That left 6,300,000 for stockpiling. If mills added a similar tonnage to stockpiles through August, September and October stocks on Nov. 1 could reach 57,800,000 tons without any deliveries in November. In the last normal sailing year, 1951, the stockpile at the end of the season was 49,098,907 tons. Stocks on hand at the end of the 1942 shipping season were well under that figure at 37,326,533 tons.

Season Will End Early

The big question revolves around ability of the mills to absorb the additional tonnage if the demand for steel dips in the fourth quarter. Most observers believe the final yearly total should be around 100 million tons. They also think the fleet will go into mothballs by Nov. 15, a very early closing date.

Earliest closing dates so far were recorded in the depression year of 1932 and during troubled labor period in 1949. In '32 no ore was shipped in December, only 170,000 tons were transported in December of 1949.

An early closing date is generally looked forward to by vessel operators who claim they can't make any money operating during the winter. Possibility of getting stuck in ice jams, plus higher insurance rates for more hazardous winter operation make profits almost impossible.

Ships Bigger, Faster

Most of the credit for this year's record breaking performance on the Lakes can be traced to addition of new vessels which average 18,000 tons with each pay load. These giants can make a trip to the Lake head and back in 5 days while older vessels take a week. Six of these ships hit the water this year and they have made a real contribution to total tonnage.

Those wondering about how the 1942 tonnage mark can be surpassed could also profit from the knowledge that the 311 vessels which fed wartime blast furnaces had an average capacity of only 9900 tons. Today's fleet boasts only 286 ships but at least 12 of these have 18,000 ton capacity.

Even though the average draught has dropped from 25.6 ft last year to 25.3 ft in 1953, sailing conditions generally have been favorable. Traffic seems to be the only problem this season as the fleet sometimes runs into delays at the Great Northern docks.

Set New Ore Shipment Record?

Previous record year for Great Lakes iron ore shipments was 1942 when total shipments reached 92,076,781 gross tons. This year could set a new record. Here is a comparison of the 2 years as of Aug. 1:

	1942 (Gross Tons)	1953
SHIPMENTS	47,357,672	50,555,082
CONSUMPTION	49,116,562	53,795,300
STOCKS ON HAND	37,326,533	38,828,970
FLEET SIZE	311 ships with average capacity of 9900 gross tons	286 ships, 12 of which have average capacity of 18,000 gross tons.

OIT Eases Steel Export Curbs

Gaining strength in supplies of steel mill products last week brought an easing of export controls over 69 carbon steel or iron products and alloy nails.

Relaxation of the shipping controls was announced by the Office of International Trade, Dept. of Commerce.

Under the revised export regulations, 50 of the 70 items now may be exported to any country, except to Hong Kong, Macao, or U.S.S.R. and its satellites. No application to OIT is required.

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SCRAP: The Patient's Not Improving

High fever of apprehension in scrap market . . . How No. 1 prices tumbled . . . Fear cutback of steel operating rate . . . Mills will currently buy less, for less—By T. Metaxas.

The sick man of industry today is scrap iron and steel. His condition is not yet critical but aloofness of the doctor, steel mill buyer, and doses of self-administered pessimism have kindled a high fever of apprehension. Whether the symptoms prove to be psychosomatic depends on the future of the steelmaking rate.

As indicated by the downturn of THE IRON AGE No. 1 Steel Scrap Composite the pulse beat of the scrap market is growing more labored. From $44.92 on July 28, No. 1 scrap tumbled to $40.00 this week. With "down" sentiments dominating and orders reluctantly offered by buyers, price fronts of all scrap centers have been breached in recent weeks.

"Catches Trouble First"

Contributing to scrap gloom, a stale wind of rumor harps on an inevitable and perhaps serious drop in the steelmaking rate. More confident of their chances of high operations, steel mills do little to instill confidence in scrap with substantial orders. Steel seemed hesitant on buying as if it were gaging future demand for its products before plunging heavily into scrap. Prevailing in manufacturing as a whole, the feeling of production uncertainty seemed to have stunned scrap more heavily than most.

As one broker commented: "Scrap always catches trouble first." Others said scrap would recover as soon as mills were forced to buy more substantially.

Now crystallized, the buying attitude of steel mills is making a more clean-cut transition to buying less, buying on shorter delivery—and at slightly lower prices which nevertheless are not calculated to wreck the hugely expanded scrap collection machine. But heavy entry of mills into the market will have a firming effect on prices.

One prominent steel buyer told IRON AGE he had placed September orders at about two-thirds of normal volume and at slightly lower prices.

Prices Still Respectable

Several steel scrap buyers seriously questioned that the bottom had dropped out of prices. Their argument hinged on the pre-World War II price of No. 1 heavy melting at Pittsburgh which for August, 1940, averaged $18.50 per ton. But for August, 1953, the average was $44.75. Even considering higher operating costs and inflation, the price of scrap is still very respectable, they said.

But the grief of scrap men is based more on buying apathy than on lower prices. Most effective of market narcotics is the skyhigh state of consumer scrap inventories. Towards the end of '52 purchased scrap stocks picked up vast weight and entered '53 at about 5 million tons. By June they had declined to about 4.7 million tons and now are under 4.5 million tons. Only the peak has been shaved from the mountain.

"He's heard a rumor that our scrap drive's unneeded."

Some major consumers claim to have 60 days and over stockpiled on the ground. Because of some production uncertainty, an abundance of scrap, and perhaps lower prices, they feel no compelling incentive to sink their cash in heavier scrap inventories. Should the steel rate decline tall stockpiles will become considerably taller.

Pig Iron Demand

Other factors militating against the market are a high industrial scrap output channelled directly to steelmakers and large stocks of pig iron. Because of frail demand for pig, the steel industry with an expanded blast furnace capacity can use more iron in place of scrap. Several mills have increased their iron charge into openhearths but many others see no long term trend developing here.

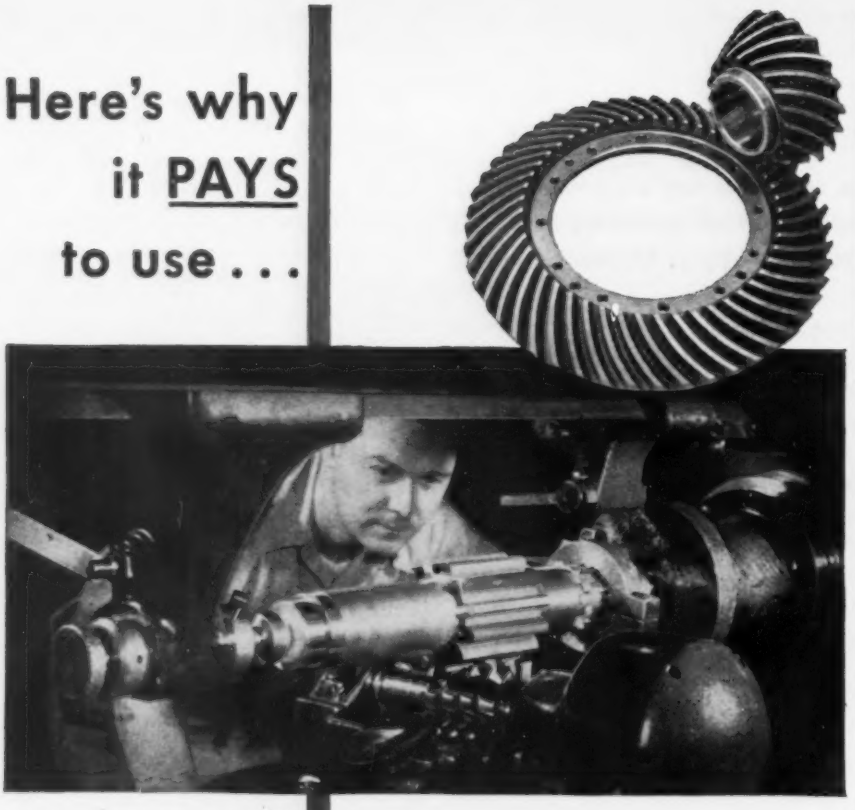
Bonus Sources Wither

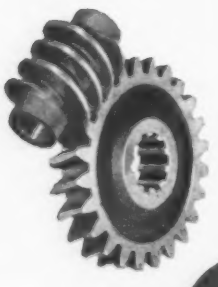
The scrap industry is not unscathed by dipping prices. Dealer intake of scrap has been substantially reduced, a nettling situation to scrap yards which have made costly expansion investments in recent years.

Bonus scrap sources, those remote or uneconomical ones drafted by shortage and high prices, are withering. Outlying scrap producers who must contend with high freight rates to get scrap to market are claiming hardship, especially some in the South. But basically the scrap machine is intact, capable of supplying all the scrap the steel industry is likely to need.

The paramount question of scrap men—how low can steel operations get in '53—must remain unanswered. But sifting all the omens of high employment, high spending, high production, that crucial steel rate may be favorably bolstered next year, although a moderate decline is seen as probable.

Here's why it PAYS to use . . .





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—Expansion—

Blooming Mill:

Inland renovating No. 2 mill . . . Job to be done in 30 days.

Inland Steel Co. will begin a complete overhaul on its No. 2 blooming mill on Sept. 28. A complete switch to new equipment is to be completed in only 30 days.

The old 40 x 90 in. mill will be completely dismantled, replaced by a 46 x 100 in. mill. The old double armature 6500-hp will remain to drive the 2-high Continental reversing mill. Many other motors from the old mill will be reused. Capacity will be 1500 tons per turn, 4500 tons a day.

Not as spectacular as some, the Inland capacity expansion has been moving steadily during the past 2 years. Four new 250-ton openhearths came in late last fall and were followed this spring by a revamping of soaking pit capacity.

Since Inland was an early participant in the shell steel program, which requires hot top quality steel, soaking pit capacity had been over-crowded.

Many Preliminaries Done

The two 105-ton mill housings for the new mill will present the biggest handling job, but the 1 month dismantlement-replacement program presents a variety of problems as well.

To facilitate work after the shutdown, several of the mill tables have been set up as subassemblies. The completed unit has merely to be hoisted into position on the rolling line and plugged in. Again, preliminary excavation work has been begun, and any auxiliary equipment that could be moved ahead of schedule is already moved.

The old mill will be stripped, blasting of concrete will follow its removal. Immediately afterward the new foundation will go in along with a new sluicing system to handle mill scale.

The overall increase in capacity is expected to largely recover any production lost during the shutdown by the end of the year.

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ZIRCONIUM: Industry Taking Over

Unique properties of the pure metal suit it for atomic reactor uses . . . AEC favors private production . . . Allegheny Ludlum starts plant operation—By J. B. Delaney.

A growing, changing, constantly diversifying technology creates demands for materials with unusual properties—properties that often have never even been considered. Pure zirconium's low neutron absorption is just such a characteristic that has become important since the advent of nuclear reactors.

Entire output of the pure sponge and metal is going into reactors. With hafnium removed, zirconium metal is ideal for this since it wastes few neutrons and has high resistance to certain types of corrosion. A classified method for removing hafnium was developed at the Oak Ridge National Laboratories of the Atomic Energy Commission.

Steelmaker Starts Melting

With the encouragement of AEC, private industry is gradually taking over production of hafnium-free zirconium from the government.

Allegheny Ludlum Steel Corp. has begun production of the pure metal at its Watervliet, N. Y., plant. Initial capacity is approximately 120,000 lbs. per year, and this may be increased in 1954.

Carborundum Metals Corp., is producing hafnium-free zirconium sponge at a new plant 30 miles east of Niagara Falls, N. Y. Under a contract with AEC, Carborundum will supply 150,000 lbs. of sponge per year over the next 5 years.

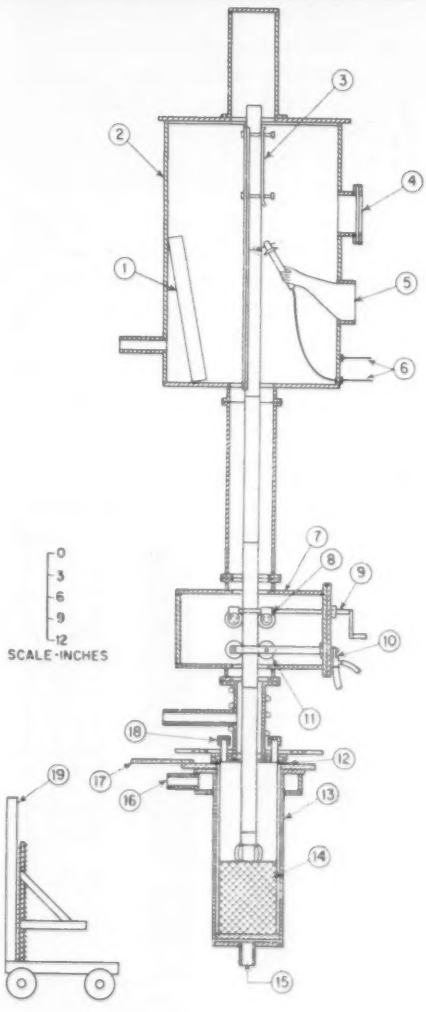
Price Slows Acceptance

Other companies have been invited to construct facilities for producing hafnium-free sponge. It is understood the government wants to increase sponge capacity to 300,000 lb per year in private plants.

Main obstacle to development of industrial uses is high price. Commercial grades, containing 2 pct hafnium, sell for $27.50 per lb in sheets, $15 per lb in powder form, $10 as sponge. While no figures are available on cost of hafnium-free zirconium, some sources indicate that sponge is worth more than $20 per lb.

But even so, the metal is believed to have a good future as a structural material. Currently the chief non-government users are the chemical and electronic industries. Titanium Alloy Mfg. Div. of National Lead Co. says zirconium is also being used for human bone replacement and repair.

ZIRCONIUM ARC MELTING FURNACE



American Society for Metals drawing shows (1) electrode supply, (2) vacuum-tight tank, (3) aligning guides, (4) viewing port, (5) rubber glove, for bar joining, (6) welding power leads, (7) drive box, (8) drive rolls, (9) electrode drive crank, (10) main electrode power, (11) power application rolls, (12) insulation ring, (13) water jacket, (14) ingot in melting cup, (15) water inlet, (16) water outlet, (17) main power to melting cup, (18) eyepiece, (19) cart for removing melting cup assembly.

Work With AEC

Carborundum Metals expects to be in full production within 6 months. In addition to producing sponge to AEC specifications, it plans to compete for commercial grade outlets within the next year.

Allegheny Ludlum's development work on zirconium has been in cooperation with AEC's Bettis Plant, Pittsburgh.

A double melting procedure is used at Watervliet believed to involve the same principle used in furnaces developed by the Bureau of Mines at Albany, Ore., although the AL equipment is much more advanced.

Techniques Improve

The Bureau of Mines prototype is an inert-atmosphere arc melting furnace employing consumable electrodes. The Bureau has virtually bowed out of zirconium melting.

Allegheny Ludlum's first experience with zirconium was in 1951 when it produced wire from billets at its Dunkirk, N. Y., plant, for Westinghouse. Bulk of current output is in strip, with some small flats and wire orders accounting for the balance. The company's experiments indicate that production of zirconium tubes on its new hot extrusion press is practical.

Once beyond the melting stage, zirconium appears to present no serious problems. Allegheny Ludlum shapes its ingots on presses or hammers. Hot and cold-rolled strip are produced on regular mill equipment at West Leechburg, Pa. Chief difference between converting zirconium and stainless steel is that zirconium requires lower temperatures during hot work.

TRADE: West Germany's Wheels Whir

Dramatic upsurge of West German exports shows extent of economic, industrial recovery . . . Favorable trade balance established . . . Eye Middle East markets—*By E. C. Kellogg.*

West Germany's startling post-war economic and industrial resurgence must be causing many European nations to wonder if it isn't the vanquished who gets the spoils. For West Germany through its own bootstrap-lifting and financial aid from the U. S., is rapidly approaching the important position that the Reich held in world business prior to the war.

A good indicator of West Germany's vitality is the spectacular increase in its exports. Almost completely out of international trade in 1946, West Germany exported goods worth only $206 million. In 1948, the deutsche mark was established, starting West Germany toward economic recovery. Exports hit $642 million.

Continuing to increase every year, exports hit a high mark of $4.038 billion last year and for the first time since the war West Germany showed a favorable balance of trade of $165 million.

A seeming paradox in West Germany's favorable trade balance last year is that 1952 imports increased 16 pct while exports gained only 8 pct. Reason for the export surplus of $165 million was the rise in the average price of exports while value of imports dropped.

Indications now are that West Germany may have completed the dramatic phase of its recovery. Exports so far in 1953 are running slightly behind 1952, though for the year West Germany should still end up near the $4 billion mark. And prospects are that its balance of trade position will be even more favorable this year because for first 6 months of 1953 it already has an export surplus of $200 million.

Accent On Machinery

Symptomatic of West Germany's industrial revival is the increasing importance of exports of finished manufactured goods to total exports. Last year finished goods accounted for 75 pct of total exports.

Of all its exports during 1952, machinery accounted for 22 pct of the total as against 16 pct in 1951. Coal and coke exports which made up 16 pct of total exports in 1951 dropped to 11 pct.

Iron and steel shipments held at a level of around $700 million in both years, but because of the increase in exports in 1952 the percentage for this category dropped from 19.6 pct to 17.1 pct.

Showing particularly strong gains last year were exports of electrical equipment, which rose from a 1951 value of $160 million to more than $250 million, and exports of ships which were valued at only $5.5 million in '51 and soared to nearly $58 million in 1952.

Distribution of West German exports has changed relatively little in the last 2½ years. Europe receives about 70 pct of West Germany's exports, North and South America about 18 pct (U. S., 7 pct) Africa around 5 pct and Asia, 7 pct.

For the future, there will probably be no dramatic disruption of this pattern. West Germany, like all European countries, is most anxious to increase exports to the U. S., but no one sees any sudden change in the U. S.-West German trade relationship.

West Germany may, however, be able to make considerable trade gains in the Middle East as resentment against Britain, France and the U. S. continues to fester.

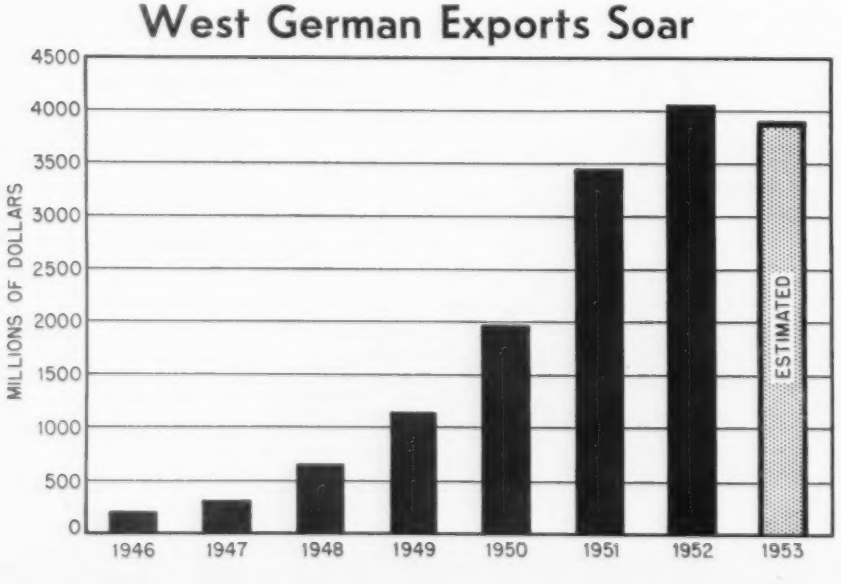
Berlin Sets Pace

Pace-setter for West Germany's economic and industrial revival has been West Berlin. Much of Berlin's industrial plant was destroyed during the war and was further depleted by Russian dismantling. Result was that it was forced into an industrial modernization program.

Industrial deliveries from West Berlin have risen from $269 million in 1949 to $684 million in 1952 and this increase in industrial activity added 100,000 jobs.

One interesting recent development which points up West Germany's export progress is the development of a deutsche mark shortage in European countries, an indication that West Germany is exporting more to these countries than it is importing. This situation, however, is not regarded as serious.

West German Exports Soar



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PLANES: West's Output Keeps Altitude

Coast planemakers continue full throttle operations . . . No major military cutbacks yet . . . Schedule more civilian output . . . Order books full for 2 years—By *T. M. Rohan.*

West Coast airplane production last week was continuing at full throttle with only slight engine sputter so far.

No significant military production rescheduling has been reported and commercial output is on the increase. Full scale military production is expected to last another year and a half with present contracts.

Total aircraft backlog in the West is now about $7.5 billion or about 2 more good years. Federal budget cuts are expected to take their biggest whack at research and development on guided missiles and marginal development such as helicopters.

Develop New Products

Some components suppliers last week reported partial falling off of orders due to cutbacks in inventory by planemakers. One jet turbine project, for instance, has been stretched from a 2-year job to 3 years.

Despite these, however, suppliers' business backlogs are still high. One of the leaders, Garrett Supply of Los Angeles, employing 7000, reported backlog last week of $120 million, up $10 million from Mar. 31.

Increase is attributed to constantly developing new products, too good for the military to overlook. These items like a ram air turbine for auxiliary emergency power and brushless induction generators the size of a man's fist have major potential.

Some Seasonal Lull

This firm, devoted about 90 pct to military production, is still actively recruiting workers in the Midwest. Last week it wound up a 2-week drive in Minneapolis-St. Paul, principally for gear hobbers, grinders, other skilled shop men and engineers.

Suppliers of big components such as engines, radar and armament systems report only minor cutbacks or stretchouts. Slowdown is attributed to much closer evaluation of new engine types than before Korean truce.

Some seasonal lull has also set in due to vacations, budget uncertainty and model changeovers. Production is continuing on existing orders booked up to 12 months ahead but new ones are slower coming in than before the truce.

Keep Deliveries Prompt

Major cutbacks by plane manufacturers are in basic materials where inventories are being whittled down. One leading stainless tube supplier to the West last week said orders have fallen off rapidly since the truce. One major customer has entered no orders at all.

For a second one, delivery promises must be met to the day or the factory is heard from. Two months ago a week's delay went unnoticed. Overall backlog for this tube supplier is half what it was a year ago and present orders far under the expected seasonal lull.

The Aircraft Industries Assn., remembering the wholesale cancellations after V-J day, this week is advancing a proposal for continued research and development in the industry. This is keyed to the fast-approaching transition from subsonic to supersonic fighter planes. Western planemakers currently turning out over 50 pct of U. S. planes are advocating sustained research programs despite easing of war pressure.

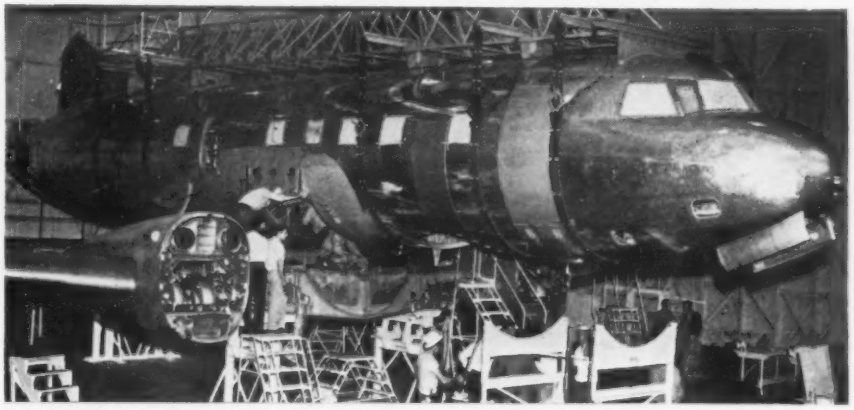
Plateau on production has admittedly been reached with about 12,000 military units scheduled nationally this year, up 3000 from 1952. Current production contracts run through 1954 but planemakers are looking beyond.

New commercial planes are expected to get increased attention. Civilian plane output this year is estimated at about 4000, practically no increase from 1952.

Boeing, for example, a few months ago announced plans for a commercial jet transport but little has been said since. Airline executives to whom plans have been shown indicate Boeing is putting heavy pressure on its development.

First $15 million prototype dubbed the "707" is expected to fly next year and head off threatened inroads by the British De-Havilland Comet. If successful, airline demand could be heavy to give passengers the thrill of riding a jet plane.

Exporting of planes will also probably increase. U. S. exports this year will be $820 million, 350 pct over 1950.



FIRST T-29D BOMBARDIER trainer for U. S. Air Force is assembled at Convair's San Diego division. The new trainer will be equipped with the latest bombardier equipment.

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CONVENTIONAL TYPE BALL BEARING. Arrows in this illustration indicate the unavoidable friction when the balls are in contact with each other.

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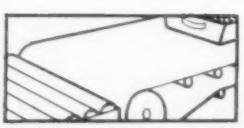
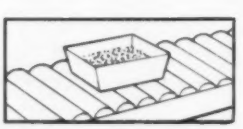


For Belt Conveyors

For Live Roll Conveyors



For Roller Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.

MARKETING: Wh re

AMA study shows method of determining sales potential in need of greatest improvement.

One of the most important fields in which little work has been done is research on marketing research. To fill in this gap, American Management Assn. recently surveyed market research practices of 168 companies most of which were in the $5 million or more per year sales bracket. It found that the method of determining sales potentials is the research function most in need of improvement.

More than one-fifth of the companies replying to the survey cited this activity as the one most in need of improvement. Second most frequently mentioned were marketing research techniques such as sampling, interviewing, tabulating and interpretation of findings.

Sales Potential Important

Better research on advertising ranked third and included such factors as tests to measure advertising effectiveness, copy research, standard reporting of audience measurement in radio and TV, standards for media selection. Also listed was the need for improving research on salesmen's activities, including evaluation of salesmen's services, and in sales forecasting.

The market research function regarded as the most vital by these companies is analysis of territorial sales potentials. Use of marketing research to determine the competitive position of a company's products was a close second, and analysis of the market for specific products ranked third.

Industrial Producers Spend Less

Average expenditure on marketing research for the firms surveyed was 10¢ for each $100 of sales. One trend apparent in the study is that the proportion of the sales dollar spent for marketing research declines as sales mount.

It was also found that manufacturers of industrial products spend less proportionately for mar-

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re the Trends?

ket research than manufacturers of consumer goods. About 32 pct of the firms surveyed said they planned to spend a higher proportion of their sales dollar on marketing research this year.

A higher proportion of small and medium-sized companies indicated they would spend more dollars for marketing research in 1953 than did larger concerns. However, even in the latter group, more than half said that they expected to increase this expenditure during the current year.

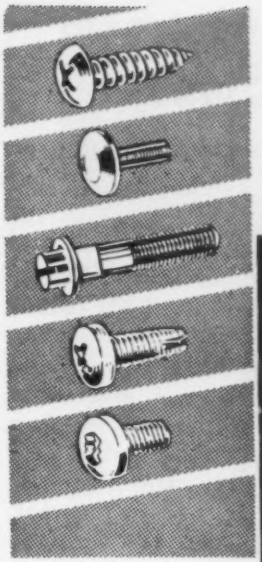
It's a Full-Time Job

Salaries of the top marketing research men in the companies studied most often ranged between $10,000 and $15,000 per year. Rate was lower in smaller companies and was less in industrial-product than in consumer-product companies.

Nearly all of three-fourths of the companies reporting said their research was performed by full-time employees who specialized in that function. This trend was apparent in all types of firms but was less pronounced in companies marketing industrial products than with consumer goods manufacturers.

Complete results on the survey are contained in a 64-p. book, *Company Practices in Marketing Research* which may be obtained from American Management Assn., 330 West 42nd St., New York 36, N. Y. Price is $1.75 for AMA members, $2.50 for non-members.

"Big boss is here, I see."



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SHIPS: Builders Man Battle Stations

New business log blank . . . No orders sighted since November . . . Congress decimates Maritime Administration subsidies . . . High U. S. yard costs hurt—By G. G. Carr.

"Nothing but a hurricane can help us now," one shipbuilder told THE IRON AGE last week. Rueful reference was to U. S. shipyards' urgent need for overhaul and repair work if they are to keep going in face of vacant order books.

Current order backlog is not pleasant reading for yard operators. Not a single major seagoing vessel has been ordered from U. S. yards since last November. Some 31 ships will be delivered this year, leaving only 38 still under construction. Without new orders, warned Bethlehem's Eugene Grace in New York last month, there will be no shipbuilding in this country by 1955.

Lose Best Customer

An economy-minded Congress recently dealt shipbuilders a body blow when the lawmakers swung the ax on a Maritime Administration budget request for $118.5 million for ship construction and construction subsidies. Of this, $44 million was slated entirely for subsidies. Amount granted was zero dollars in subsidies.

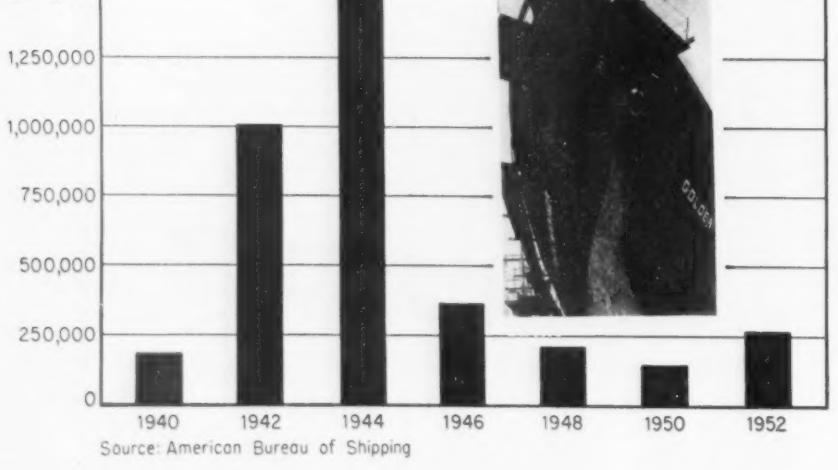
Maritime Administration was given $59 million, but only for liquidation of contracts already started. An additional $65 million was asked for operating subsidies. Congress granted $55 million in two increments—$20 million in one and $35 million in the other.

This bit of money saving took the yards' No. 1 customer almost completely out of the market. Generally speaking, and with the exception of specialized vessels like tankers and ore boats, nobody but the government can afford American-built bottoms. American flag ship operators must in most cases ask Uncle Sam for money both to build and operate their ships profitably.

Tough All Over

If the future is cold, shipbuilders at least have warm memories. Total tonnage completed this year will be a near peacetime record. At the halfway mark, American yards delivered 20 major vessels totaling 282,652 gross tons and 442,633 deadweight tons. Propelling machinery installed in the vessels totaled 275,350 hp.

Decline in shipbuilding is actually worldwide. Yards in all countries are reverting to their normal peacetime or poor business status. American yards are hit hardest first because of their high cost, subsidized operations.



Could Glut Market

Outlook for repair and overhaul work is a little better, but not much. Ship operators understandably avoid paying high U. S. yard charges whenever possible. Modernization is an expensive business, and, since speed is not usually a prime consideration in water shipping, pressure for up-dating equipment is relatively low.

It's notable that some World War I Hog Island class ships are still sailing the seas profitably (though not necessarily under the U. S. flag).

Shipbuilding boom of the last few years could play a large part in the yard operators' undoing. Worldwide shortage of bottoms following V-J day was largly artificial, caused principally by the U. S. government's mothballing policy. Release of a large part of the Maritime Administration's reserve fleet of over 1800 ships could glut the market, although admittedly not with ships of the most recent type.

Build 50 Yearly

In Washington last week, L. R. Sanford, president of the Shipbuilders Council of America, urged scrapping of 1000 Liberty ships now in the reserve. He told a Senate subcommittee that these ships are obsolete in terms of the possible emergency for which they are kept.

As an alternative, Mr. Sanford proposed a 50-ships-a-year program similar to that of the Maritime Administration prior to World War II. Cost to the government would be about $200 million a year, comparable to present interest on wartime shipbuilding expenditures, he said.

Buttressing his arguments is a new bulletin of the Committee of American Shipping Lines Serving Essential Foreign Trade Routes. The publication charges that the U.S. merchant fleet is headed for

"creeping obsolescence" and that 83 pct of the fleet must be replaced within the next 13 years.

The committee stresses the need for a "workable formula" for the use of government funds in helping private enterprise build new bottoms. They also urge that war-built ships, when replaced, be transferred to a special reserve fleet.

The report also charges that arguments between government agencies over ship construction payments have delayed if not prevented construction of urgently needed vessels.

If this country is to compete effectively with foreign flag shippers, the bulletin states, a projected fleet of 62 passenger or combination passenger-cargo vessels is needed instead of the existing fleet of 34.

Fear Employment Dip

Shipbuilding is traditionally an important, if erratic, steel consumer. During the wartime peak in 1945, the industry used 3,374,000 tons of steel, or 5.9 pct of total steel output. Postwar cutbacks dropped consumption to 373,000 tons or 0.59 pct in 1947. But the rate rose the next year, in 1952 was 1,029,000 tons or 1.6 pct of total steel production.

Employment in shipyards is currently around 260,000, split almost evenly between private and naval shipyards. Wartime peak came in 1943 when 1,655,500 persons were employed in the yards.

"Just which one of you needs recharging?"

Maintenance

MAKING CONNECTIONS on 51-ton rotor of 3000 hp motor at McLouth Steel Corp.

Vacationing Mill Overhauled

While two steel plants vacationed, squads of General Electric engineers, technicians recently overhauled and rebuilt major electrical equipment. The 133-man GE team crammed in a lot of heavy maintenance, worked 12 hours a day for 9 days, at McLouth Steel Corp.'s Michigan plants at Trenton and Detroit.

If the plants had been operating, the job would have taken more than a month. Such overhaul would have considerably crimped operations, resulted in major productive inconveniences. By doing the work on vacation time, GE's technicians staved off the loss of a single ton of steel.

Accompanying 7 tons of equipment, 14 men left GE's Schenectady plant for McLouth while other motor experts were recruited from service shops at Detroit, Baltimore, other cities throughout the East and Midwest. Converging on the plants they faced the primary task of reconditioning the Trenton plant's blooming mill drive, involving a main motor generator set with a 7000-hp synchronous motor, three 1750-kw generators, two 3500-hp motors, and cleaning and reconditioning all auxiliary motors and generators, rewiring control panels.

Made right on the job were special tools and jigs to meet unusual repair problems. GE's Pittsburgh service shop contributed some. Brazing equipment came from Schenectady. A spare armature was shipped. When it was found necessary to replace coils on the huge motors, a special messenger hurried them from the factory. Replacements for two burned out transformers were flown to the mill.

Rigging and moving posed problems with only one crane available. After overhauling, a rotor weighing 70 tons was delicately swung back into place with a clearance of 3/1000 of an inch.

Considerably more work was done than had been anticipated. But despite this, all electrical work was completed and tested only 45 minutes behind schedule—at 11:45 a.m. on the day before the plant was to start rolling again. At 9:00 p.m. of the same day the mill was set to go.

A tribute to the skill and knowledge of the repair crew was that the job was completed without a single accident despite the speed of the operation.

First Quarter Copper Setasides

Ammunition cups and discs continue on a production directive basis of 100 pct in the National Production Authority announcement of military setasides of copper and copper-base alloy products for first quarter 1954 delivery.

First-quarter percentages were named last week in Amend. 2 to NPA Order M-11A. The amendment applies to defense programs in categories A through E.

In general, percentage reserves for military and atomic energy orders have been revised downward. NPA says reserves will be modified "at appropriate times," to make certain that producers will have sufficient production capacity available for civilian orders.

Stay Mum on Copper Stand

State Dept. intends to discuss fully with Chile the possible purchase of 84,000 lb of copper before disclosing publicly the U. S. negotiating position, it was learned late last week.

Official silence on the government stand was predictable. Defense Mobilization Board, which in late August selected a set of points for consideration, passed its recommendations to State Dept. without announcing them.

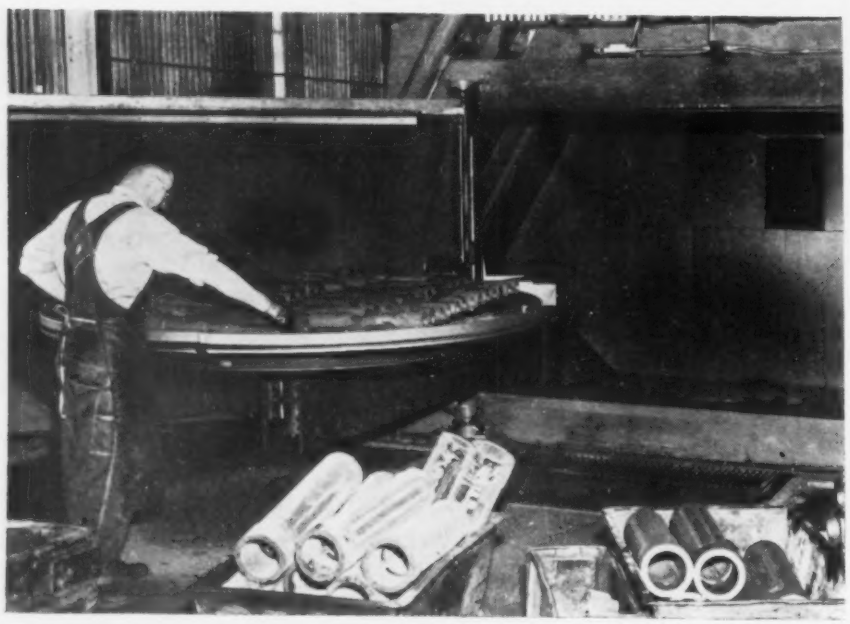
Arthur S. Flemming, Defense Mobilizer and DMB chairman, would comment only on the quantity of copper involved. This amount —84,000 tons—represents a sizable boost over the 65,000 tons initially mentioned by Chile in its request for help in reducing its copper surplus. At the present rate, buying of the higher amount would require about $50 million.

Air Cushions Protect Army Cargo

Large inflated pillows will be used by the Army to protect military cargoes on overland hauls.

Known as pneumatic dunnage, the pillows were developed through the efforts of industry and the Quartermaster Corps. The dunnage, deflated, is placed in the spaces around supply items being prepared for shipment. Air is then pumped into the dunnage to hold the cargo in place.

Besides protecting supplies, the dunnage may save loading time and lumber needed in shoring systems. It is expected that the pillows may be reused indefinitely.



DOUBLED CAPACITY over manual airblasting of castings is claimed for swing-table airless blast cleaner at Halliburton Oil Well Cementing Co. Machine handles 14,000 lb of castings in 8 hours at about ½¢ for parts up to 50 lb, ¼¢ for larger. Built by American Wheelabrator & Equipment Co., machine has 86-in. rotating table. In the compartment metallic shot is thrown against castings by bladed wheels.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Draft gears, couplers and allied parts, 18302 ea, $96,710, Magor Car Corp., New York.

Automatic threading machines; special tooling, 3 set, $55,120, Lloyd & Arms Inc., Philadelphia.

Modulator, 158 ea, $205,449, National Electronics Lab., Inc., Washington.

Voltage standing wave ratio test set, 50 ea, $87,575, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis.*

Test oscillator set, 920 ea, $113,638, Taffet Radio & Television Co., New York.

Spare parts for fire control, radar equipped, $100,000, Western Electric Co., Inc., New York.

Replacement and spare assys, $165,000, Northern Ordnance Inc., Minneapolis.

Berths, folding aluminum, 9000 ea, $60,471, U. S. Chaircraft Mfg. Co., Bloomfield, N. J.

Litters, aluminum, 3351 ea, $114,368, Bingley, Inc., Brooklyn.

Automotive spare parts, 11900, $139,944, Reo Motors, Inc., Lansing, Mich.

Automotive spare parts, 10800, $55,899, Ainsworth Mfg. Corp., Detroit.

Automotive spare parts, 84650, $484,261, General Motors Corp., Flint, Mich. *L. E. Steffen.*

60 MM mortar, M19, 6862, $2,528,724, Whirlpool Corp., St. Joseph, Mich.

Trucks, pickup, 51, $59,269, General Motors Corp., Detroit, *E. F. Gormsen.*

Fin assy, 95584, $1,319,936, Saginaw Industries, Saginaw, Mich.

Trucks, cargo, 284, $994,853, Chrysler Corp., Detroit.

Rocket assys, 86000, $274,340, General Motors Corp., Lansing, Mich., *A. E. Goosen.*

Automotive spare parts, 318200, $216,036, Chrysler Corp., Detroit.

Axles, rear & front, 2000, $614,000, Chrysler Corp., Detroit.

Automotive spare parts, 60800, $6,062,092, Reo Motors Inc., Lansing, Mich.

Rocket assys, 97500, $1,686,760, General Motors Corp., Lansing, Mich., *A. E. Goosen.*

Airspeed and machinery, number and indicators, 613, $192,268, Kollsman Instrument Corp., Elmhurst, N. Y.

Primers, electric, 19247500, $576,077, Remington Arms Co., Bridgeport, Conn.

Initiators, M4, 9330, $160,569, Espey Mfg. Co., New York.

Cups, ctg. cal. 50, 167858, $73,858, The Plume & Atwood Mfg. Co., Thomaston, Conn.

Initiators, M4, 9330, $228,119, Red Arrow Electronics, Orange, N. J.

Devices catapult, 8458, $685,098, Espey Mfg. Co., New York.

Metal parts for shell, HE, 60 MM, mortar, 400000, $537,009, Motor Wheel Corp., Lansing, Mich.

Tracer, M5A2B1, 11840 units, $103,803, Grinnell Screw Products Co., St. Clair Shores, Mich.

Auto spare parts, 78450, $221,657, General Motors Corp., Flint, Mich., *L. E. Steffen.*

Trucks, stake & platform, 20, $56,502, Fargo Motor Corp., Detroit.

Tube burster, 290000, $26,100, Bathey Mfg. Co., Plymouth, Mich.

Forging for shell HE, M107, 155 MM, 30000 units, $438,800, Canadian Commercial Corp., Ottawa, Canada.

Plug loading accessories for deep cavity loaded shell, 5571000, $594,982, Odel Die Casting Corp., Detroit.

Trucks, stake & platform, 15, $30,265, Ford Motor Co., Dearborn, Mich., *F. E. Christian.*

Telescopes, M90C, 598, $69,736, Argus Cameras, Inc., Ann Arbor, Mich.

Auto spare parts, 16000, $287,800, Reo Motors, Inc., Lansing, Mich.

Trucks, 2½ ton, 5400, $38,356,988, Reo Motors, Inc., Lansing.

Guns, 420, $764,944, General Motors Corp., Pontiac, *M. F. Rummel.*

Replenishment of tools, 140, $1,065,900, The DeVilbiss Co., Toledo.

Replenishment of hardware, 2934, $715,856, Stewart Warner Corp., Indianapolis, *A. N. Phillips.*

Replenishment of motor vehicle parts, 16000, $92,160, General Motors Corp., Detroit, *R. C. Campbell.*

Just as a catcher needs protection . . .

IRON and STEEL
***Need* PROTECTION**

If your product is made of iron or steel, and exposed to the elements, protect it against the ravages of rust by Hot-Dip Galvanizing — the best possible rust preventive when applied by Hanlon-Gregory. For longer life, greater uninterrupted service and substantial savings in maintenance, specify Hot-Dip Galvanizing . . . SEAL IT IN ZINC.

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— Flat
● Round
Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

☐ Armature Banding Wire

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

☐ Lock Safety Wire

Tough, durable, workable. In the size and type for your work.

☐ Spring Wire

Any shape* . . . high carbon . . . hard drawn . . . high tensile . . . stainless . . . galvanized . . . tinned . . . bright.

*Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

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Industrial Briefs

New Home . . . NATIONAL MACHINE TOOL BUILDERS' ASSN. reports that construction of a 2-story building to house its offices will be started shortly in Cleveland.

In Operation . . . LATROBE STEEL CO. has begun operations in its new branch office and warehouse at 741 Ramsey Ave., Hillside, N. J.

Big Move . . . CRUCIBLE STEEL CO. OF AMERICA has returned to Pittsburgh after a 32-year lapse. Its new headquarters are in the Oliver Building.

Hydraulic Machine . . . BALDWIN-LIMA-HAMILTON CORP., Philadelphia, has received an order for one of the largest universal testing machines ever built from Lehigh University, Bethlehem, Pa.

New Moniker . . . CIRCO EQUIPMENT CO. is the new name of Topper Equipment Co., Clark Township, N. J.

Field Tests . . . ELECTRO REFRACTORIES & ABRASIVES CORP., Buffalo, is now making field tests of new and improved refractory materials in the kilns of several customers.

Bonus Plan . . . Employees of Horton Chuck & Gabb Special Products, division of the E. HORTON & SON CO., earned a 15 pct bonus over and above their regular wages for July as a result of the first month's operation under the Scanlon Productivity Plan.

Anniversary Celebrations . . . CLARK EQUIPMENT CO. is observing its 50th year of operations. Founded in 1903, the company has had a sustained growth from the beginning. Record highs for sales and earnings were established during 1952.

Buys Machinery . . . EASTERN STAINLESS STEEL CORP. has purchased machinery from Alan Wood Steel Co. to roll stainless steel Diamondette floor plates for its mill.

Mill Installation . . . HYDROPRESS, INC., New York, is supplying a complete aluminum foil rolling mill installation to Takada Aluminum Co., Osaka, Japan.

Appointed . . . NELSON STUD WELDING DIV., Gregory Industries, Inc., Lorain, Ohio, has appointed the Honolulu Iron Works Co. a distributor.

Big Doings . . . SOCIETY OF AUTOMOTIVE ENGINEERS, INC., will hold its 1953 National Tractor Meeting & Production Forum, Sept. 14-17 for engineers who design and manufacture mechanized farming equipment, at Hotel Schroeder, Milwaukee.

Switch System . . . LAMSON CORP. has developed a new airtube automatic switch system. Paperwork, reports, test samples, and similar materials can be moved swiftly from one point to another by means of this latest development in pneumatic handling.

Consolidation . . . THE TIMKEN-DETROIT AXLE CO.'s shareholders approved an agreement of reorganization and consolidation between The Timken-Detroit Axle Co. and Standard Steel Spring Co. The new corporation will be known as Rockwell Spring & Axle Co.

Sales Agent . . . ACE-CENTRAL STATES MACHINE TOOL CO., Detroit, has appointed the Simmons Machine Tool Corp., Albany, its exclusive export sales agency.

New Prexy . . . Clifford A. Hampel, chemical engineering consultant, Homewood, Ill., has been elected president of the CHICAGO TECHNICAL COUNCIL.

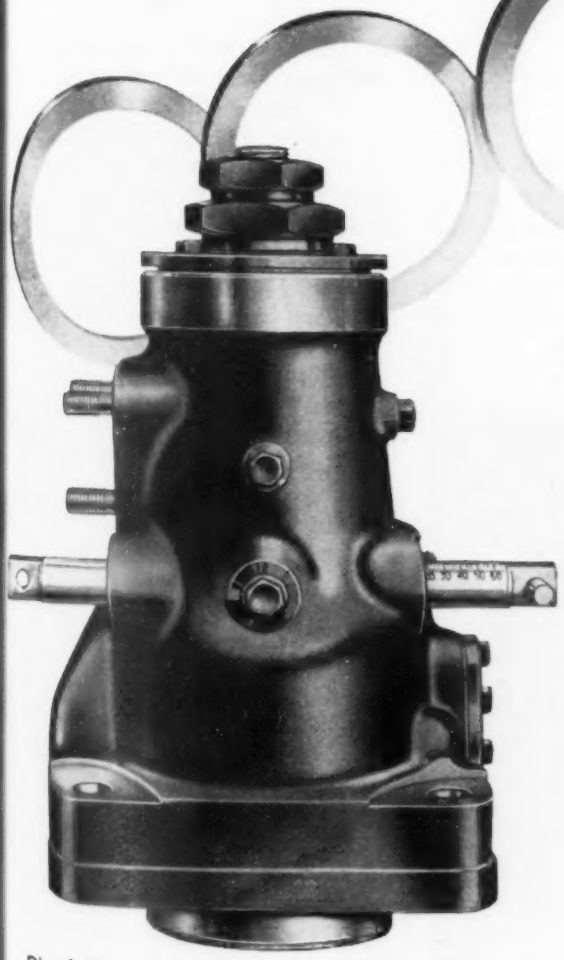
Automatic Welding . . . C. B. HERRICK MFG. CO., Cleveland, is building a line of standard equipment for automatic welding to be marketed by dealers throughout the country. Also featured will be machinery specially designed and built for automatic welding applications.

Distributor . . . KAISER ALUMINUM & CHEMICAL SALES, INC., Oakland, Calif., has appointed Hanna Steel Corp., a distributor for its aluminum products in Birmingham and its adjacent trading area.

Hear Ye . . . SOCIETY FOR APPLIED SPECTROSCOPY, will hold its Sept. meeting at the Hotel New Yorker, on Sept. 15.

Moving Day . . . RIC-WIL CO., has moved its sales, engineering and administrative offices to Barberton, Ohio.

TO MAKE HEAVY-DUTY COPPER Gaskets USE REVERE DEOXIDIZED Tube!



Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful. . . . This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

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Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere.

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

Automakers Push Mechanic Training

Detroit worried over shortage of trained service station mechanics . . . Some feel training neglected in past . . . Start service courses . . . Stress quality—*By R. D. Raddant.*

One of the most pressing shortages, in the industry that has faced an abundance of them in recent years, is the shortage of trained mechanics to man automotive service garages.

This shortage has progressed to the critical point because of a number of factors, but the principal ones are:

(1) Number of automobiles has increased tremendously;

(2) Complexity of today's new car requires a high degree of skill and continuous education;

(3) Growing reluctance of young men to become garage mechanics has been aggravated by raids on the ranks by other industries.

Has Training Lagged? . . . To combat this situation, resourceful auto companies have entered into broad programs of service training and education. In some circles and within certain companies, it is thought that this training lagged behind other branches of the business. Uncounted millions were spent in other directions, while little was done for a long time toward improving car service.

The industry tended to forget that in most cases an auto owner's only contact with the company after the original purchase is when he brings his car through the service entrance for service or repair.

But if this branch has been neglected in the past, steps are being or have been taken to improve service quality and to assure a sufficient number of trained mechanics.

Build Training Centers . . . General Motors recently began construction of the first of 35 GM training centers. When all are completed by March 1955, 5000 unit courses will be administered annually in each center.

SERVICE MANUAL comes in handy for pair of mechanics in solving a toughie. They're enrolled in Chrysler's Master Technicians Service Conference. Other auto firms are also backing mechanic training programs.

For Ford and Lincoln-Mercury dealers, there are 38 service schools which mechanics attend for courses on new developments and servicing techniques. In addition, Ford has 33 mobile units that visit dealerships for training service mechanics.

Run Correspondence Course . . . In Chrysler Corp., 8718 dealers have subscribed to Chrysler's Master Technicians' Service Conference, a continuing technical correspondence course prepared by Chrysler and administered by its dealers for training their service personnel.

That is a brief sketch of the programs of the Big Three. Independents are setting up similar programs to train their mechanics to insure good service for their customers.

Most companies also have wide programs in which they cooperate with educational institutions, high schools, trade and technical schools. They supply them with equipment, tools, engines, transmissions, service manuals and other material.

Start Service Laboratory . . . Ford Div. is in the process of setting up a new Service Laboratory which will be housed in a 31,000-sq-ft unit and employ 150 persons in studying service problems and establishing the best methods of solving them. Its first function is to work on dealers' service problems, to provide them with the information in the form of publications, and then to establish technical standards of service.

This center will develop the correct tools to deal with problems and the best methods for handling them, see that dealers' service departments get the information.

From Ground Up . . . GM's new training centers are unique in that they will be the first such centers to be constructed from the ground up for training service personnel. With one exception,

each of the 35 centers will be specially constructed with eight service classrooms, one for each of these divisions: Chevrolet, Pontiac, Oldsmobile, Buick, Cadillac, GMC Truck and Coach, Fisher Body, and United Motors Service. The first is under construction in Parma, Ohio, and others will be erected close to metropolitan areas.

Instruction methods vary from company to company. But all courses are built around new parts, features, and developments that require special instruction. New transmissions, complicated "extras" like air conditioning, power brakes, power steering all are preceded by intensive instruction courses.

Explain New Models . . . In the GM program, for example, the series starts with the New Product School, which is a special cramming course that precedes each new model. The scope of this course varies, depending on whether many major changes were embodied in the new car.

Other courses follow on what might be called primary troubles that tend to occur in a specific model. Mechanics are trained to recognize them and go to the source of the trouble immediately.

A quality appeal in servicing has been established by Lincoln-Mercury where a program of Registered Mechanics Progress has been developed. Each mechanic receives diplomas or certificates for courses completed and professional standards are emphasized. The Lincoln-Mercury mechanic actually rubber stamps his name on a service job he completes.

Job Not Finished . . . The extent of these courses is tremendous. More than 100,000 mechanics have been trained in Chrysler courses and Ford should pass 100,000 shortly in its 3-year program. In the Chrysler program, RCA supplies 9000 recordings and uses 54,000 ft of film each month.

In spite of these programs, the shortage isn't easily combated. Young fellows don't take to mechanics jobs like they used to and the job demands a higher type of workman, creating a gap between supply and demand.

Wages aren't necessarily the problem because mechanics' wages are usually equal or better than prevailing industrial wages. The answer probably lies in continuing educational programs, plus recruiting plans aimed at establishing the job as desirable and respectable.

Living Cost Pay Rise for UAW

Rising living costs give more than 1 million auto workers tied to escalator clauses of UAW contracts another cent an hour pay raise with the release of the mid-July cost-of-living index.

It is the first adjustment to be made since the precedent breaking revision in the 5-year pact late last spring. Another tenth of a point higher on the index would have given the auto workers another full cent. In mid-July, the index stood at 114.7, a record cost-of-living high. Several hundred thousand salaried workers will get comparable increases in December.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Aug. 29, 1953...	129,069*	26,293*
Aug. 22, 1953...	136,658	26,977
Aug. 30, 1952...	100,092	22,567
Aug. 23, 1952...	88,778	20,833

*Estimated. Source: *Ward's Reports*

Buick Moving Up on Plymouth

Ambitious Buick, which has its eye trained on third place in the industry, is getting close to that spot here and there.

Registration figures put Buick in fourth place in Michigan for the first 7 months of 1953. Other states in which Buick is in third are Arizona, North Carolina and Wisconsin.

There is little chance, however, that Plymouth will drop out of its practically permanent position in the top three.

THE BULL OF THE WOODS — By J. R. Williams

THIS IS OUR LAST PAY CHECK FOR SUMMER WORK! THE NEXT THING WE'LL BE LOOKIN' AT WILL BE A REPORT CARD!
AN' THAT WON'T BE NOTHIN' TO SMILE AT-- I COULD SOCK YOU FOR EVEN MENTION-ING IT!
9-4
T. M. Reg. U. S. Pat. Off.
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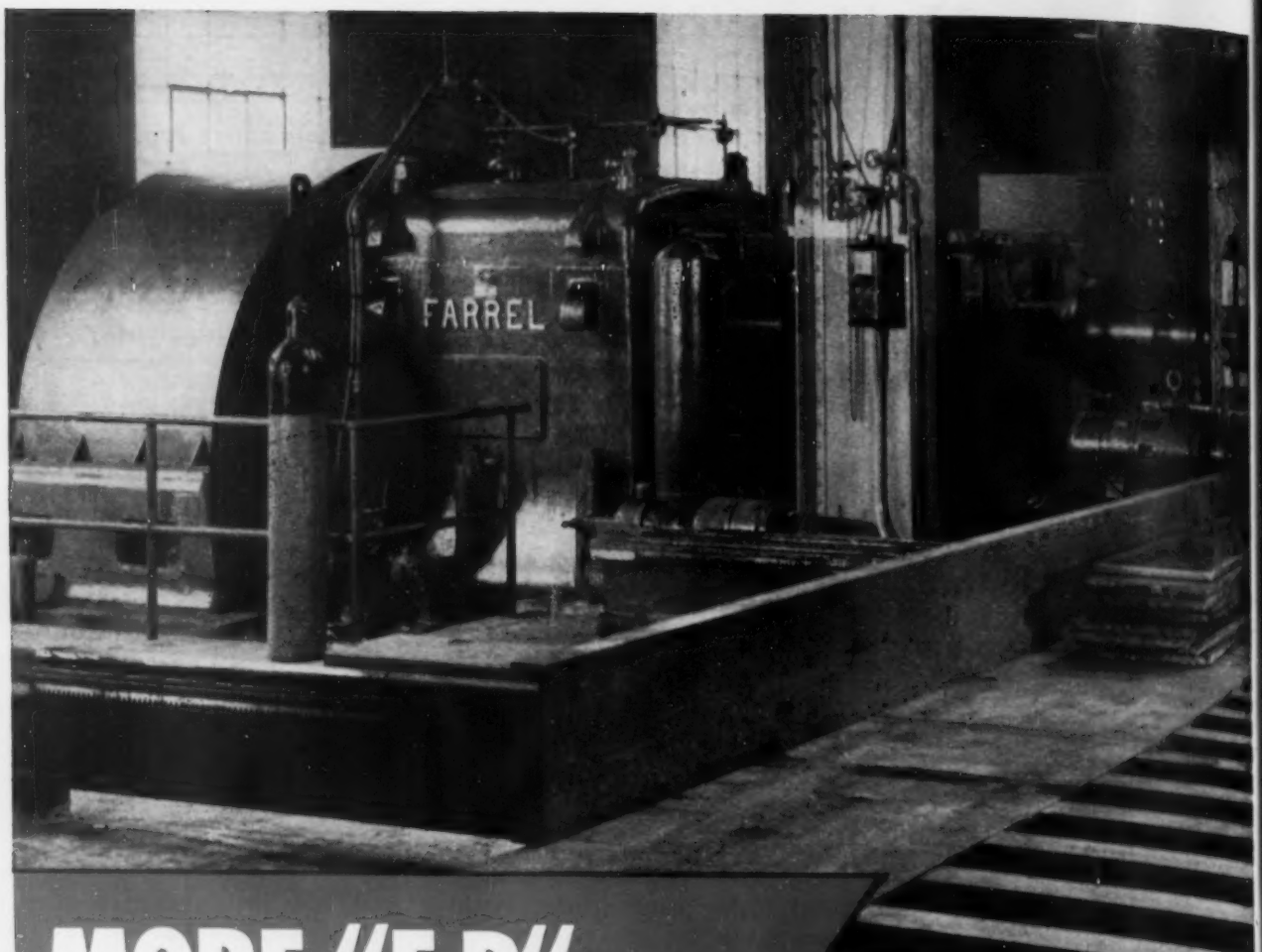
THE BITTER END
J.R.WILLIAMS



MORE "E P."... what it means to you . . .

A lubricant for enclosed reduction gears should have plenty of "EP"—Extreme Pressure characteristics — to protect against wear under the heavy loads imposed in steel mill service. *Texaco Meropa Lubricant*—always famous for all-around performance — now has increased "EP."

The new and improved *Texaco Meropa Lubricant* not only protects better, but maintains higher "EP" longer. It does not separate in service, storage or centrifuging; and is not affected by high operating temperatures or moisture. It does not thicken, does not foam, and is non-corrosive to bearings. *Texaco Meropa Lubricant* assures longer gear and bearing life, lower maintenance costs.

For oil film bearings on roll necks, use *Texaco Regal Oil*. It's turbine-quality, with outstanding resistance to oxidation and sludging.

Call in a Texaco Lubrication Engineer for practical suggestions on raising efficiency and reducing costs throughout your mill. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

Will End Distress Area Bid Preference

ODM expected to drop policy of preferred treatment for labor surplus areas in bids for government contracts . . . Awards will be given to lowest bidder—By G. H. Baker.

Government contracts, from here on, are to be awarded only to low bidders. Previous policy of permitting manufacturers in labor-surplus areas to match low bids submitted from other areas is headed for the scrap heap.

Officially, the Office of Defense Mobilization has not reached a final decision on this controversial question. Arthur S. Flemming, ODM chief, is on the receiving end of tremendous pressure from congressmen representing "distress" (high cost, low employment) areas. Sen. Saltonstall, R., Mass., says he wants to know if ODM intends to flaunt the will of Congress.

Rewriting Order . . . But ODM is quietly writing a basic revision of DMP-4 (governing awarding of contracts to "distress" areas) which will bar firms in labor-surplus areas from a second chance to submit bids. Such a move will effectively prevent any firm from consciously matching, on a second chance, a lower bid.

Prospect of extra-high tax write-off rates for "distress" areas grows somewhat brighter as a result of the prohibition on matching bids. ODM still hasn't made up its mind on this point, but some officials believe that unusually liberal amortization rates will be extended labor-surplus areas as a concession designed to soften the blow against preferential treatment on bidding.

Ponder Nickel Decontrol . . . Ottawa's decision to drop some government controls over nickel is being carefully studied in Washington. ODM still hasn't reached a decision on nickel decontrol. Industry representatives want controls dropped as of the end of this quarter, but ODM is making a careful study of supply and demand before arriving at a decision.

Canadian government lifted restrictions over the sale of nickel-bearing stainless, low-alloy steels, and nickel-bearing copper and aluminum alloys, citing the recent improvements in the supply situation, but it's too early to tell whether the Canadian move is a forerunner of similar action in this country. It is known that Washington officials are paying close attention to Canadian prices and markets. Their final decision may be influenced by what's happening north of the border.

Home Builders Cautious . . . Home builders are becoming increasingly skittish over starting any projects for which they do not have firm commitments. Shortage of mortgage money is the reason.

National Assn. of Home Builders is telling its members to postpone new projects until the mortgage market "returns to a reasonable state of normalcy."

Danger of this trend lies in the possibility of reduced orders for metal building materials, home appliances, and housewares. The appliance trade, in particular, has been experiencing spotty markets for months.

Any further cut-backs in new home construction point to further reductions in the production of furnaces, stoves, washers, refrigerators, plus the many other smaller products.

"Certainly we can get materials to do your job if you don't mind using plastic for nickel."

Drop Suit . . . The Federal Government has decided to drop its 8-year-old antitrust suit against the cement industry.

Assistant Attorney General Stanley N. Barnes says little could be gained by bringing the suit to trial, since the industry has long since abandoned the practice of basing-point pricing. Cement, like steel, is now sold f.o.b. mill.

MRO Rules . . . Makers of unclassified products, materials, including controlled materials, now may write their own authorizations to obtain maintenance, repair, and operating materials. Self-authorization for MRO previously had been limited to manufacturers of "A" and "B" products.

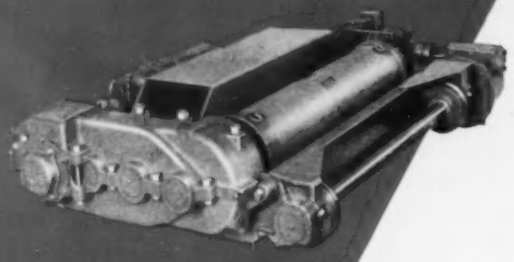
A second change (Dir. 3 to DMS Reg. 2) covers MRO requirements of construction contractors under DMS.

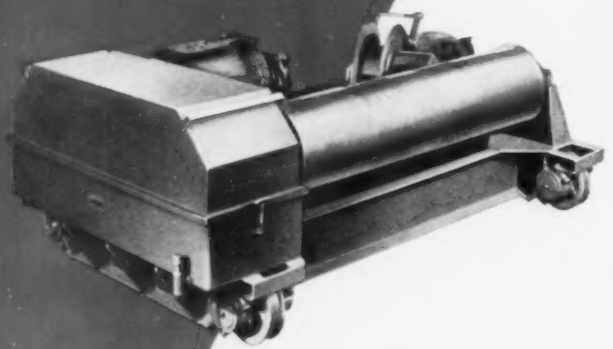
The directions also permit acquisition of installation materials needed for completion of defense contracts by means of self-authorization.

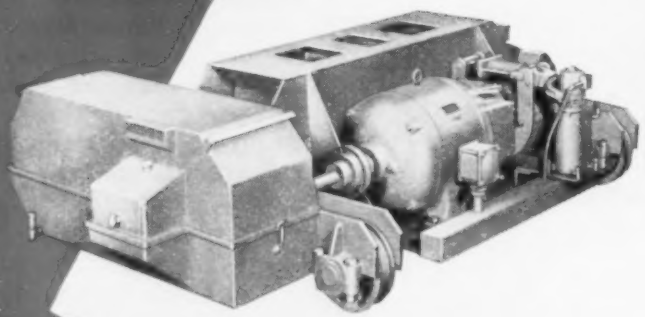
As a result of these two changes, contractors now can avoid having to make special requests and obtaining individual approval for priority authority to obtain repair parts and materials needed for completion of defense contracts.

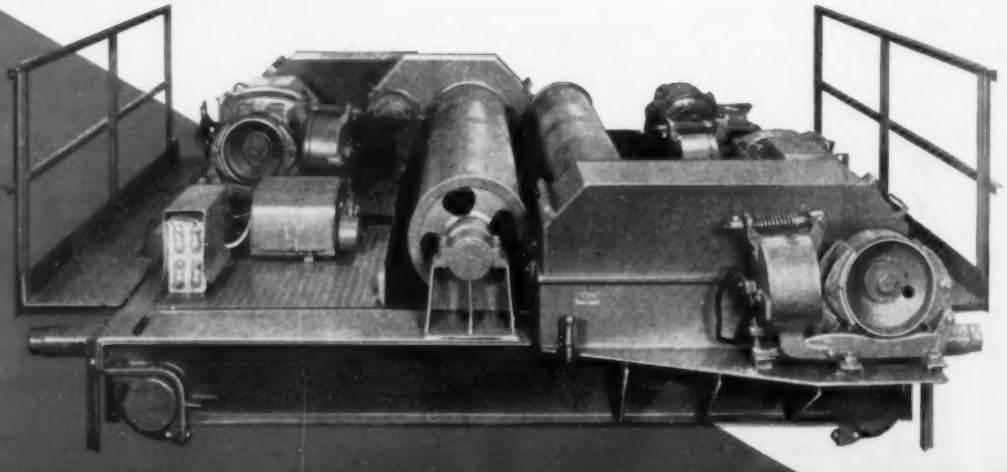
Modernize

your Overhead Cranes with NORTHERN Super TROLLEYS









Your overhead crane can be only as efficient as its trolley. On its rugged strength and mechanical superiority depends the whole continuity of its operation.

NORTHERN SUPER TROLLEYS are designed and built to withstand severe overloads and shock; to provide continuous, trouble-free operation; are constructed with all parts instantly available for inspection, and to minimize downtime for maintenance.

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LABOR: Ready Taft-Hartley Changes

Eisenhower aides ready Administration statement on labor law changes . . . Release due before Congress returns . . . Durkin reorganizes Labor Dept.—By *R. M. Stroupe.*

National leaders favoring a strong Taft-Hartley Act are hopeful the White House will refrain from advocating the removal of needed muscles in the labor law.

Aides to President Eisenhower are known to be working on a summary of Administration views concerning Taft-Hartley, but the date and manner of presentation were not being revealed last week. Labor Secretary Martin Durkin said the statement would be made public "soon," or at any rate before Congress returns to Washington.

May Urge Caution

Whatever the President proposes on the controversial law is sure to come under fire from some quarter. For example, any suggestion that the ban against secondary boycotts be liberalized would certainly bring on sharp criticism on Capitol Hill and in the business world.

It is expected—though by no means assured—that the President now may be receiving advice on exercising caution in backing Taft-Hartley changes, rather than calling for sweeping and fundamental changes.

In this atmosphere of uncertainty, Secretary Durkin disclosed recently that he may recall his department's labor-management advisory committee to discuss certain unnamed problems. These, he said, did not include the Taft-Hartley issue.

Integrate Bureau Policy

Mr. Durkin made this statement last week as he announced a reorganization of his agency to provide more effective liaison between individual bureaus and the department's policy makers. The change is understood to be in line with requirements Mr. Durkin named before accepting the Cabinet post.

Individual bureau planning, it is anticipated, will be closely fitted into top-level departmental policy from the outset, whereas previously such plans were not submitted for "topside" approval until they were in final form. To insure that this close teamwork is effected, four officials of assistant secretary rank have been given responsibility for the various bureaus and offices.

Provide Skilled Labor

Harrison C. Hobart, newest of the assistant secretaries, who will be in charge of standards and statistics, will supervise the Bureaus of Employees' Compensation, Labor Statistics, the Women's Div., Wage & Hour and Public Contracts Div., and the Employees' Compensation Appeals Board.

Assistant Secretary for Employment & Manpower Rocco C. Siciliano will be in charge of the Bureaus of Apprenticeship, Employment Security, and Veterans' Reemployment Rights. This move, according to Mr. Durkin, was made to help the department in meeting the problem of providing adequate skilled labor when and where needed by industry.

Spencer Miller, Jr., assistant secretary for international labor affairs, will oversee the world contacts of all the bureaus. Success in this post would aid Mr. Durkin's plan to achieve harmony between the department and Congress on international matters.

NEW SETUP for Labor Dept. being checked by Labor Secretary Martin Durkin (Seated at right) and four aides.

Stress Basic Policy

James E. Dodson, the administrative assistant secretary, will have charge of the Office of Budget & Management and the departmental library.

Durkin predicted the reorganization will allow him "more time to deal with basic policy questions and to advise the President and the Congress on labor policies."

He announced that regional labor-management committees would be set up to meet special manpower problems, particularly the difficulty of assuring vital industries of enough skilled manpower. This action would be in keeping with Mr. Durkin's apparent intention to keep the department active in manpower matters.

Reshuffle Materials Agency

Government activities designed to stimulate scarce production, now a General Services Administration function, will be managed by a new Materials Div. within that agency's stockpile organization.

GSA inherited the responsibilities of the Defense Materials Procurement Agency when the latter was abolished last month (THE IRON AGE, Aug. 27, P. 40). The change in overall authority, says GSA administrator Edmund F. Mansure, will produce no let-up in efforts to reach announced raw materials goals.

Mr. Mansure says operations will be performed by fewer personnel and a smaller organization. He makes it clear that the new division is subordinate to the Emergency Procurement Service, handling stockpile functions.

The "intimate relationship" between production and procurement programs, Mr. Mansure says, makes it advisable to have both in one organization.

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See Aluminum Demand Continuing

Kaiser Aluminum vice-president predicts strong market to '58 . . . Credits federal surplus guarantee, new uses . . . Producers stress coal as new power source—*By T. M. Rohan.*

A solid aluminum demand through 1958 was foreseen by the third ranking U. S. producer last week despite a few soft spots.

In an extemporaneous talk before the San Francisco Security Analysts, D. E. Browne, Kaiser Aluminum vice-president, said government guarantees to buy surplus plus continuing new applications assure a good market.

Growing Fast . . . His firm last week started its eighth and final potline at the Chalmette, La., reduction plant. This brought the fiscal year's expansion to May 31 to $100 million of a $230 million program since 1950.

The Baton Rouge alumina plant will get into full capacity production in 4 months with increasing use of Jamaica ore, 1200 miles away, and decreasing use of Surinam ore, 2600 miles away, bought from Alcoa.

Earnings Outlook Good . . . Kaiser earnings will equal $1.56 a share compared to $3.25 last year. Earnings would have been about $3 per share if $20.5 million depreciation and amortization had not been charged against earnings. Next year they should be about $38 million, then about $40 million for 3 or 4 years, dropping to about $8 million annually by 1959.

Mr. Browne expects some interruptible power curtailment in the Northwest this September and October but none thereafter.

Coal Heats Up . . . He told THE IRON AGE that future expansion may be in coal areas. Coal markets have fallen sufficiently, he indicated, to assure a good long term power-generation source. The next aluminum plant may well be on top of a coal mine. Natural gas supply is assured for at least 20 years in Louisiana but industrial growth may exhaust it in 30-35 years.

Mr. Browne also revealed Kaiser is purchasing 186,000 tons of primary pig and ingots from Aluminum Co. of Canada, on a 5-year arrangement similar to the Aluminum Co. of America purchase.

Other western aluminum producer outlets last week indicated demand has dropped from 10 to 20 pct for October sales. The dip was attributed to fabricators working off inventories accumulated during scarce buying. Basic demand is still strong, however, and sales for the year are expected to be at a record high.

Return of the Salesmen . . . Sales representatives for eastern premium steel mills were touring the Pacific Northwest last week for the first time since 1949. Cold rolled sheets and plates at about $15 a ton higher delivered price than from regular western producers were being offered and accepted.

ALUMINUM SHEET INGOTS now being cast experimentally at Alcoa's Vancouver plant. They'll soon be cast interchangeably with extrusion ingots.

Plates have traditionally been one of the West's tightest items with the Northwest at the end of the supply line. Sheets were also being offered as a result of eastern tinplate softening.

Last comparable Northwest foray by eastern mills was in the 1949-50 period when competitive delivered western prices were met, especially on sheets.

Growing Up . . . The Westinghouse Sunnyvale, Calif., plant came of age last week. Heavy manufacturing has expanded at least 60 pct in the last 2 years and 100 pct in 3.

Employment is now 3200, highest since the World War II peak of about 10,000 when, as the Joshua Hendy Co., it mass-produced steam engines for Liberty ships. Only western maker of large electrical equipment, it turns out steam turbines, generators, transformers, switchgear and motors plus special equipment.

What It Makes . . . Major units in production are the first of three 66,000-kw steam turbines, largest built in the West, and a supersonic air compressor for the Air Force wind tunnel at Tullahoma, Tenn., believed the world's largest piece of rotating equipment.

A 40-ft vertical boring mill, equal to the largest in the U. S., was installed late last year to build the compressor.

Weigh Expansion . . . General Electric recently reported possible expansion of its 91,000-sq ft wire and cable plant in Oakland. Some years ago the firm planned installation of a major capital goods manufacturing unit in the West but recurring labor unrest reportedly sidetracked the project.

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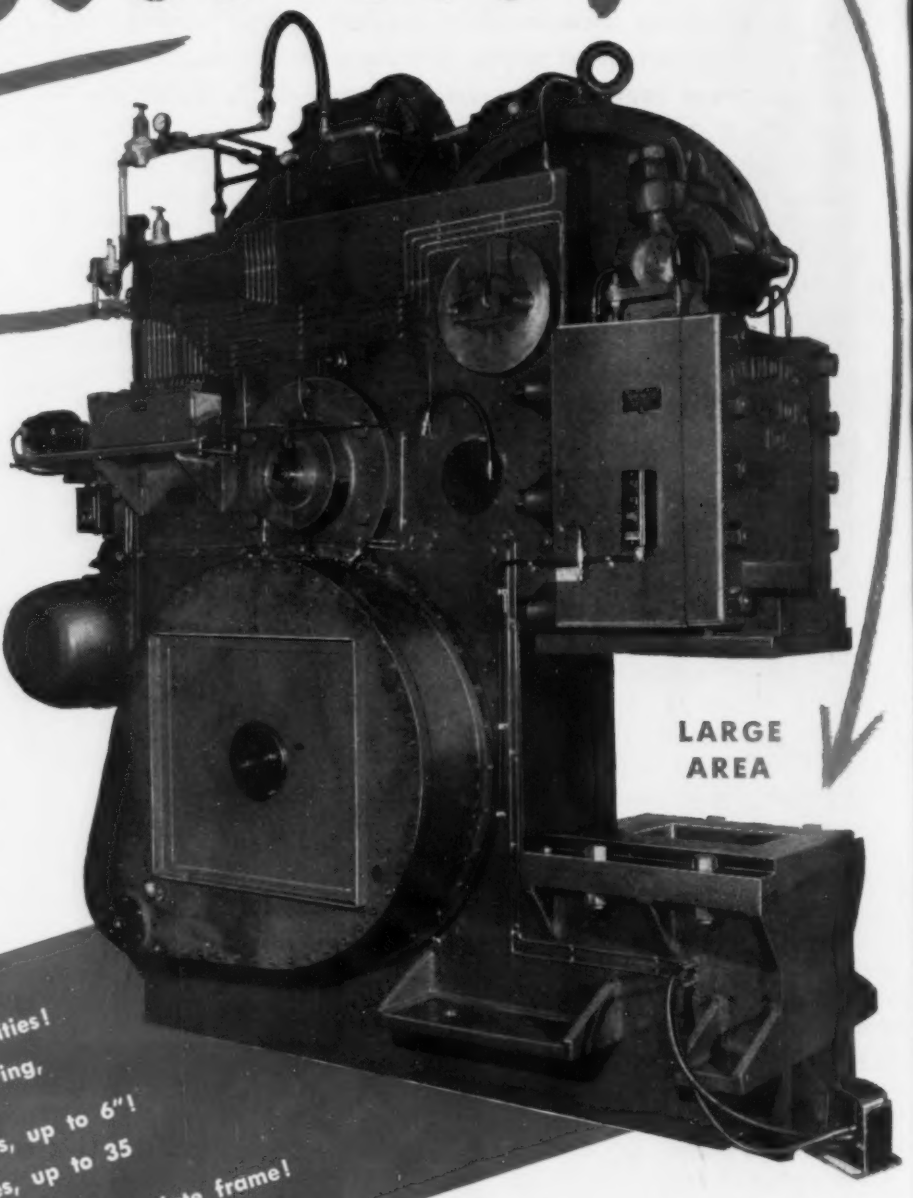

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DRILLING PUNCHING CUTTING SHEARING BENDING

Finishing Costs Push Use of Tumbling

Industry is beginning to regard tumbling as an integral part of its production setup . . . Some aircraft manufacturers are tumbling large components—By *E. C. Beaudet.*

High finishing costs are focusing greater attention on the tumbling of precision-machined parts to remove sharp edges, burrs and surface imperfections.

While tumbling has been practiced for many years, certain segments of industry are now beginning to look upon it with more interest. The feeling is growing that tumbling should be considered more widely as an integral part of the production setup in parts processing rather than for limited applications only.

For Aircraft Engines . . . Some companies are now adopting tumbling methods for a wide variety of parts having different materials, sizes, shapes and weights. At least one aircraft engine manufacturer is presently tumbling 50 pct of all the precision-made parts going into its engine. Some of these are tumbled 3 or 4 times in various stages of manufacture.

Tumbling has not only been found satisfactory from the standpoint of improved microfinish and uniformity of radii, but it also makes plating and painting processes easier.

Used With Large Parts . . . One growing major development in tumbling has been the successful processing of large, intricate parts. Previously, tumbling has been used mostly for the processing of small parts.

Several aircraft engine manufacturers are reported to be tumbling major engine components on a production basis, including nose sections and crankcases.

Can't Tumble Loose . . . Major engine parts in some cases are quite bulky and heavy and can't be tumbled loose. Suitable fixtures, differing to some extent from holding fixtures used in machining, have to be designed. When parts are held in the fixture, they undergo considerably more abrading action than those tumbled loose.

Fixtures must be designed so that the part travels through the abrading mixture in the position which gives the best results in the shortest time. They must hold the part secure enough to prevent loosening and yet not tight enough to damage the fine finish.

One of the most difficult aspects of tumbling fixture design is making a fixture which is rigid without being massive. In addition, the part must be completely exposed so that the tumbling material can reach all surfaces.

As more experience is gained in the tumbling of large intricate parts, the cost saving possibilities of the process may result in wider acceptance by industry.

Plan Tool Show . . . The largest permanent machine tool exhibit ever assembled under one roof by an individual organization is being planned by the S & S Machinery Co., Brooklyn, N. Y.

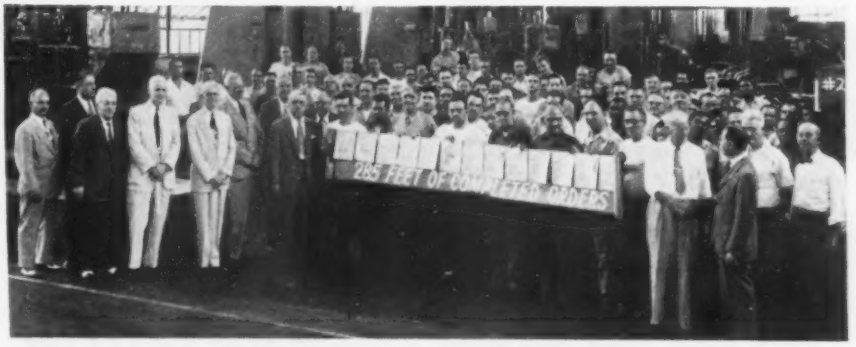
Tools ranging from huge boring mills down to the smallest precision screw machines, lathes, millers and grinders will be on display. Both foreign and American machine tools will be exhibited.

Several hundred foreign manufacturers have already been invited by S & S to display their wares and American machine tool builders will be contacted soon. Chambers of commerce of several states and different foreign countries are expected to take part in arranging for the show.

Raise Productivity . . . Technology is probably the most important factor responsible for industry's continually increasing productivity. This view is expressed by the Council for Technological Advancement in a study of factors involved in the measurement of productivity.

Higher percentage of capital investment in equipment in recent years has brought about an improved quantity and quality of tools and has also increased hp per wage earner thus increasing manhour output.

Practically unlimited possibilities for increasing the nation's production are seen by the council since increases in productivity are largely based on the introduction of new and improved equipment.



TWO HUNDREDTH CARLOAD of elephant size machine tools was recently shipped from the heavy shop addition to Cincinnati Milling Machine Co.'s plant No. 2. Dedicated February, 1952, all these large machines were built and shipped from the heavy shop in 18 months.

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REPORT TO MANAGEMENT...

Kingpin of the economy

What does the "Consumer" mean to you—someone fleshlessly statistical who whimsically exerts "Demand" in varying voltages to power your company? Or do you see him as the real kingpin of the economy served ultimately by all of industry? Even if you do not cater directly to his needs, don't exempt yourself from scrutinizing his growth, spending power, migration, tastes, or fulfilling his sometimes psychological needs.

Consumer spends with security

Today America is populated by 160 million buyers who live in symbiosis with industry. Numbers of the consumer have grown from 76 million in 1900, and by 1960 he should be 170 million strong. To understand him probe beyond knowledge of his numbers for motivations that compel him to buy or curb his buying . . . On your side is his eternal urge for comforts, conveniences inherent in our culture of expanding technology. But his buying initiative can be anaesthetized by reduction of income, fear that the future holds recession, or disgust at too-high prices which he feels will come down soon. To help give the consumer security practice economic psychology right in your own plant—where the consumer works for you.

Where his money went

Know how the consumer spends. For instance in 1929 he put 12 pct of his personal consumption expenditures into durable goods, 47.9 pct in nondurables, 40.2 pct in services. In depression year 1933, the ratio was 7.5 pct to durables, 48 pct to nondurables, 40.2 to services. The hardest cut in hard times was dealt to durable goods, though each category suffered because of lower income.

Prosperity means more on products

In 1951, 13.3 pct of personal spending went to durables, 54.6 nondurables, and 32.4 to services. As of June '53, on an annual rate, the consumer with much more disposable income in his wallet ($247.7 billion against $231.7 billion last year) spent 13.3 pct on durables, 53 pct for nondurables, 33.7 pct for services. It seems he spends more heavily on products during prosperity, less on services—as 1933 and 1953 figures show.

Purchasing power deep freeze

How does the consumer save? Overdone, thriftiness deep freezes too much immediately needed purchasing power. Too frail a savings rate knocks the stuffing out of our cash safety cushion. In 1929,4.5 pct of disposable personal income went to savings. Come depression 1933 and the rate fell to minus 2.6 pct. For 1947 (spending spree year) the savings rate was 2.3 pct of income; 1948, 5.5 pct; 1951, 7.5 pct; 1952, 7.2 pct; June '53, 6.9 pct.

Savings rate is overly high

The June rate was pushed down by a rise in consumer debt but is still outstandingly high, minimizing so-called hazards of heavy installment buying. Some economists claim savings are too high, should be cut by industry offering the consumer new products and lower prices when possible. Tap the consumer's bank account, sell proportionately less on credit, and the economy gains more forward motion. At any rate the consumer debt, when such towering income savings are considered is not yet dangerous.

More pocketbook potency in '54

Meanwhile spending remains virile. Early August consumer spending, as reported by Dun & Bradstreet, surpassed the similar '52 period—and for July the spending barometer rose to 138.5 from June's 134. Next year the consumer will have more pocketbook power through reduction of income taxes, cutting of excise taxes on many products. Tack on to this spending bonus the money industry will gain through death of excess profits and the spending power boost could exceed $12 billion.

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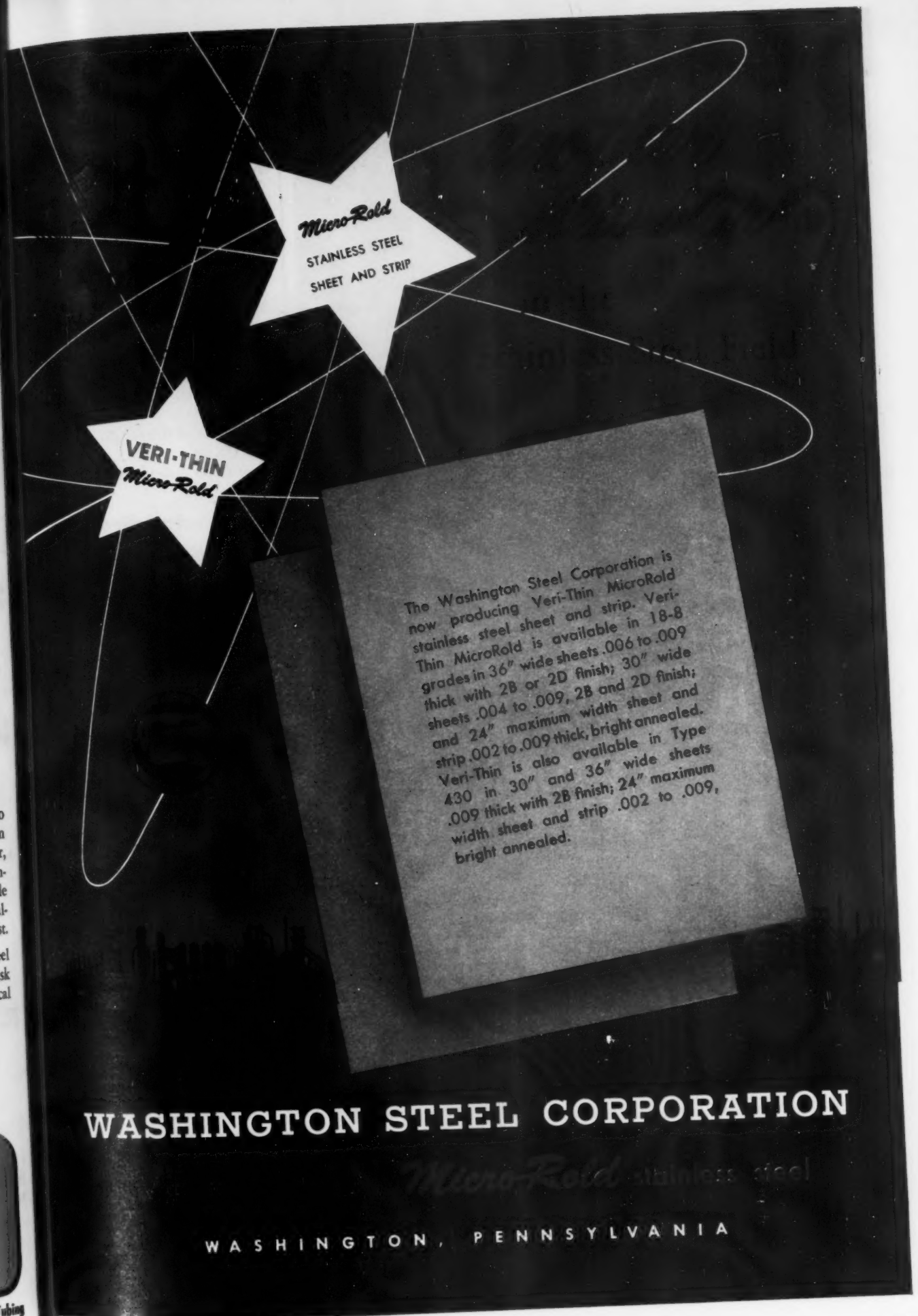
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The Washington Steel Corporation is now producing Veri-Thin MicroRold stainless steel sheet and strip. Veri-Thin MicroRold is available in 18-8 grades in 36" wide sheets .006 to .009 thick with 2B or 2D finish; 30" wide sheets .004 to .009, 2B and 2D finish; and 24" maximum width sheet and strip .002 to .009 thick, bright annealed. Veri-Thin is also available in Type 430 in 30" and 36" wide sheets .009 thick with 2B finish; 24" maximum width sheet and strip .002 to .009, bright annealed.
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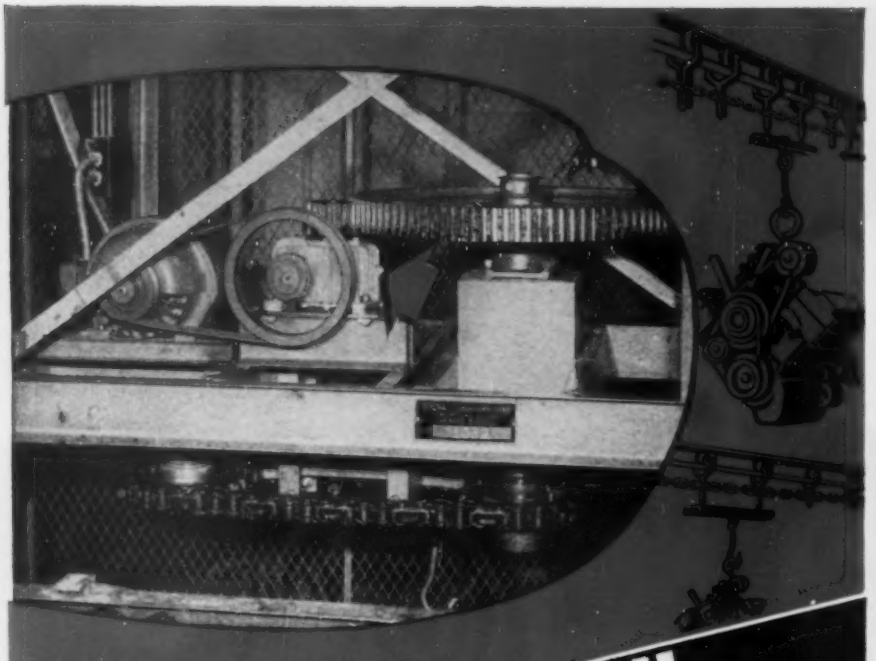

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This 3-hp. drive unit, made by General Conveyors Corp., Van Dyke, Michigan, for a 1500-ft. long monorail conveyor, carries half the load of moving 170,000 pounds of V-8 automotive engines hour after hour, month in and month out. It's the kind of modern installation that demands continuous trouble-free operation.

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The ruggedness and maintenance-free long wear life of standard Cone-Drive reducers make them 'naturals' for conveyor drives. In addition, original units or replacement parts for these units can be delivered off-the-shelf for any emergencies.

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Standard and special carbon and graphite components and materials for chemical, electrical and mechanical applications are described in a new catalog available from Stackpole Carbon Co. Recently revised and enlarged, the 44-p. catalog contains a wealth of data on carbon and graphite as applied to products ranging from battery and welding carbons to tube anodes, electrical contacts, bearing materials, seal rings, rail bonding molds, graphite for spectrographic analysis and others. *Stackpole Carbon Co.*

For free copy circle No. 13 on postcard, p. 87.

Distributor directory

A convenient pocket-size directory giving the names addresses, and telephone numbers of 32 Cooper Alloy stainless steel valve and fitting distributors and their numerous warehouse locations is now available. The directory covers the U. S., Canada and Cuba, and gives locations for all of the company's distributor representatives. *Cooper Alloy Foundry Co.*

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Air tool care

Keep 'Em Cutting is a bulletin containing a rotor tool maintenance plan to make your air tools produce more. Issued by The Rotor Tool Co., the information in the booklet is applicable to all makes of air tools, shows how to care for tools and gives practical and helpful maintenance tips. Rotor service engineers are available to explain the plan as it applies to your tools. *The Rotor Tool Co.*

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Coolant filters

Delpark filters are spotlighted in a new folder. Designed to fit the specifications of Gardner grinders, these filters are said to provide clean coolant, increased machine efficiency and greater savings. *Industrial Filtration Co.*

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Now Hotpoint pays 40% less

Cast-in screw thread demonstrates close tolerance and improved finish produced by shell molding technique as practiced by Woodruff & Edwards, Inc., Elgin, Ill. Minor grinding for removal of gates and runners is only finishing step required.

for this part...

cast to close tolerances at much lower cost with Resinox-bonded shell molds

Shell molding helps industries producing for the mass markets to take advantage of new production efficiencies that result in:

- **lower end-unit cost**
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- **higher quality**
- **quicker adjustment to the needs of the market**

For example, Hotpoint's new automatic dishwasher with its "Phantom Drain" unit. By shell-mold casting of gray iron parts, Woodruff & Edwards, Inc., who supply this part to the Hotpoint Co., sliced unit production costs nearly in half by a 100% elimination of machining costs. Threads are cast to exact specifications and close tolerances are held throughout the finshed part. Improved design was another gain, since the smoother cast surface offers less resistance to the flow of water when the dishwasher is in use.

Monsanto will be glad to tell you more about the cost-saving advantages of new foundry techniques made possible through research in industrial resins. In addition to resins for shell molding, Monsanto also supplies phenolic and urea core binders, and Lytron-886 sand conditioner. For further information on these new products and processes, fill in and mail the handy coupon below. Resinox, Lytron: Reg. U. S. Pat. Off.

Cutaway of "phantom drain" unit used in Hotpoint's automatic dishwasher.

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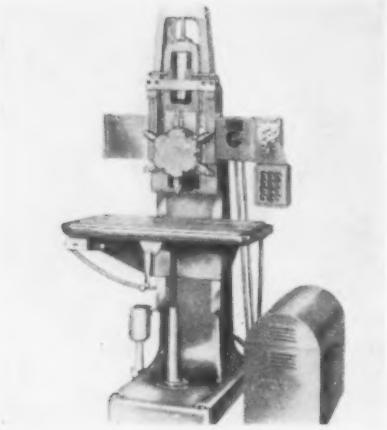

Turret drill cuts costs on second operations

A 6-spindle automatic turret drill is designed to cut costs on any second operation for small lots or a large quantity of parts. Outstanding feature is the infinitely variable hydraulic feed which can be manually controlled for automatic operations. Increased efficiency of the model enables one operator to operate one or more machines at the same time. Infinitely variable feeds will meet most exacting specifications. Twelve pre-selective spindle speeds are available for each spindle. Nineteen-in. table travel with large work table allows large or small parts to be handled on this machine. Skip indexing will eliminate loss of time where 4 or 5 tools are used. Precision double ball bearing spindles insure long, trouble-free operation. Simple control enables women operators to operate efficiently and without fatigue. *Burg Tool Mfg. Co.*

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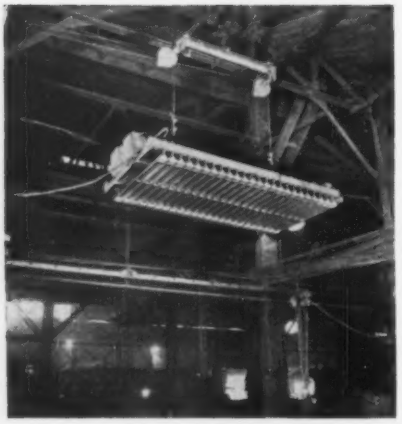

Infrared heaters speed mold wash drying

Mold wash drying need no longer be an all-night or all day job. Penetrating far-infrared electric heat speeds the drying of molds to give the surface hardness needed to produce smoothest casting surfaces. Heating by this method is conveyorized, saving the handling labor and floor space normally required to stack molds for air drying. At Ohio Steel Foundry Chromalox far-infrared electric radiant heaters dry silicone wash on molds for gear castings in 7½ min. A single bank of 24 heaters rated at 1.8 kw is suspended over the conveyor carrying the molds. During drying the heaters are lowered to within a few inches of the top of the molds. About 25 drag molds are dried per hr. Molds are cooled by a fan at the end of the heating line. *Edwin L. Wiegand Co.*

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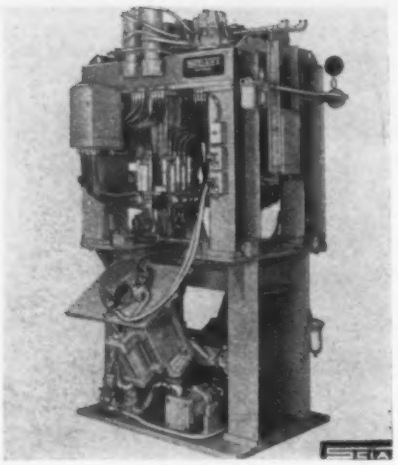

Welder offers multiple gun applications

A versatile standard welding machine is offered to the metalworking industry for all types of multiple gun applications in production. The SX 36 G is a Sciaky standard multiple gun base machine with fabricated steel superstructure for the arrangement of welding guns and transformers. Two individually operating platen units are loaded in the extended position —swing-in, and lift to the welding position. After the welding sequence is completed, they retract and swing out for unloading. Platens measure 18 x 24 in. The vertical retraction feature of the platen permits welding a wide variety of deep-drawn piece parts. Simultaneous operation in lifting, welding, and retracting permits long piece parts to be passed through the middle of the machine to accomplish large weld patterns in one operation. All welding controls are pre-set. *Sciaky Bros., Inc.*

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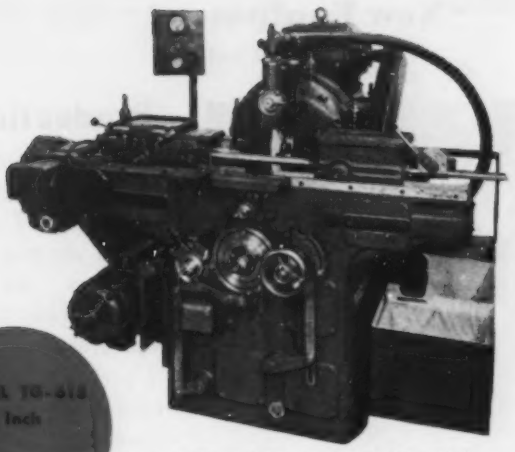
Turn Page

Quality threading
AT MINIMUM COST



MODEL TG-618
6 x 18 Inch

The 6 x 18 Automatic Thread Grinder is used for high production thread grinding with either single or multi-ribbed wheels on relatively small parts.

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AUTOMATIC THREAD GRINDERS:

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- Reduce handling cost
- Eliminate costly rethreading after heat treatment
- Eliminate expensive retooling when specifications change
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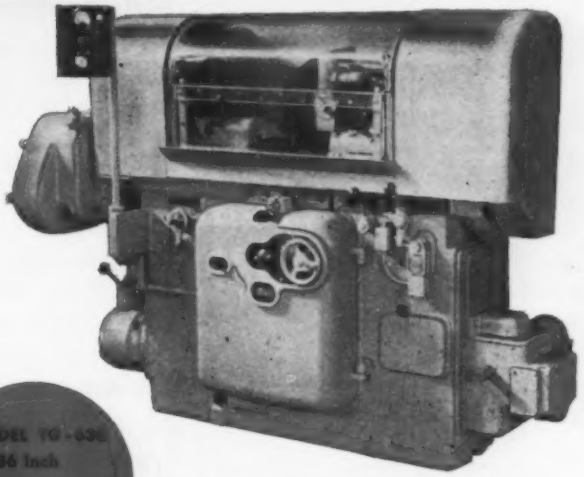
- Automatic infeed on successive cuts
- Automatic sizing
- Rheostat wheel speed control
- Diamond or crush dressing of wheels
- Multi-ribbed threading
- Right and left hand threading



MODEL TG-636
6 x 36 Inch

The 6 x 36 machine is extremely versatile and is used on long or short run jobs on a great variety of precision threaded parts. Single or multi-ribbed wheels may be used.

MODEL TG-1245
12 x 45 Inch

The 12 x 45 machine is used for grinding threads on a wide range of work from small to large heavy parts. Single or multi-ribbed wheels can be used.

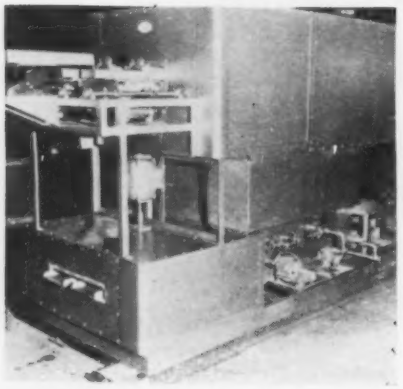
When measuring the value of a thread grinder remember the extra benefits of J&L top-flight construction. Write Dept. 710 for illustrated catalog.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 511 Clinton St., Dept. 710, Springfield, Vt., U. S. A.

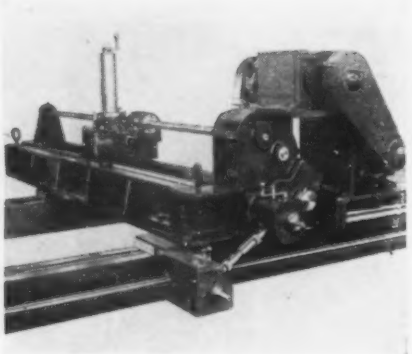
THREAD GRINDER DIVISION



Production line heat treat unit is automatic

Unitline can be used for the clean heat treatment, carburizing, dry cyaniding of small or large parts which do not have to be handled on trays. No operator is required for its operation since it is a package unit which can be placed into a production line and which will take parts from a conveyor and deliver them to a discharge conveyor. No transfer of parts being processed is required and the parts are not handled at all if the proper conveying systems are furnished to and from the unit. Unitline can be made for individual running of 1 to 4 different parts simultaneously at individual cycles. Temperatures can be 1750°F in the hardening furnace; 1350°F in the draw furnace. *Ferguson Equipment Corp.*

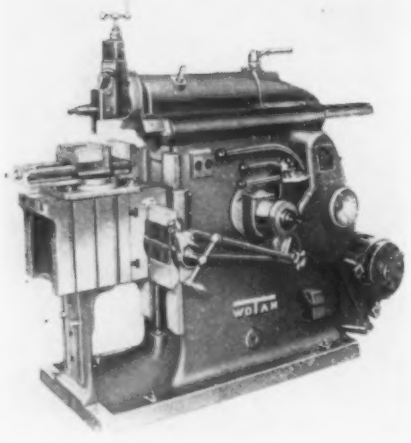
For more data circle No. 20 on postcard, p. 87.



Milling-facing machine can be taken to the job

Designed for heavy duty precision milling and facing on jobs too large, or so situated as to make their removal to the machine shop impractical, this universal milling and facing machine can be taken to the job. It functions with speed and precision, the manufacturer states, and is suited for resurfacing hammer bases in forge plants and for use on motor bases, bed plates and similar components. Spindle speeds range from 9 to 72 rpm; cutters from 3 to 15 in. diam can be used. Any surface angle can be maintained and surfaces up to 84 in. wide can be accurately milled. Longitudinal travel rails can vary in length. *Forney's, Inc.*

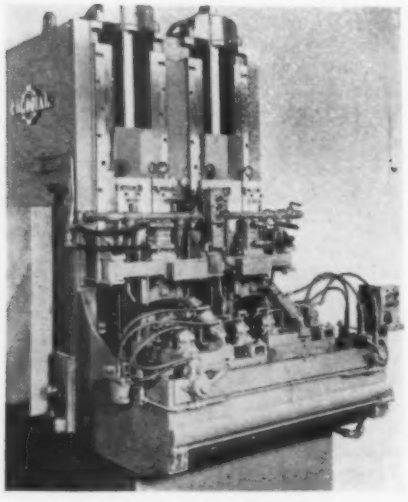
For more data circle No. 21 on postcard, p. 87.



V-ram shaper for toolroom and production work

Ease of operation, accuracy and versatility make the 22-in. precision V-ram shaper suited for toolroom and production work. Powered by a 5 hp motor, 8 ram speeds between 12 and 132 strokes per min are obtained by the shifting of only two levers. The engaged speed can be read by a conveniently located speed indicator. Sliding gears and spline shafts are ground and run in an oil bath in the totally enclosed gear box. Power feed to the table operates in both directions at rates from 0.01 to 0.04 in. per stroke. Power downfeed to the tool slide and automatic tool lifter are available. Both the plain and universal table are supported at the front end in all positions. Length of ram stroke as well as position of stroke can be changed while the shaper is in operation. Vital lubrication points are automatically lubricated by a built-in Sundstrand oil pump. *Parker Machine Co., Inc.*

For more data circle No. 22 on postcard, p. 87.

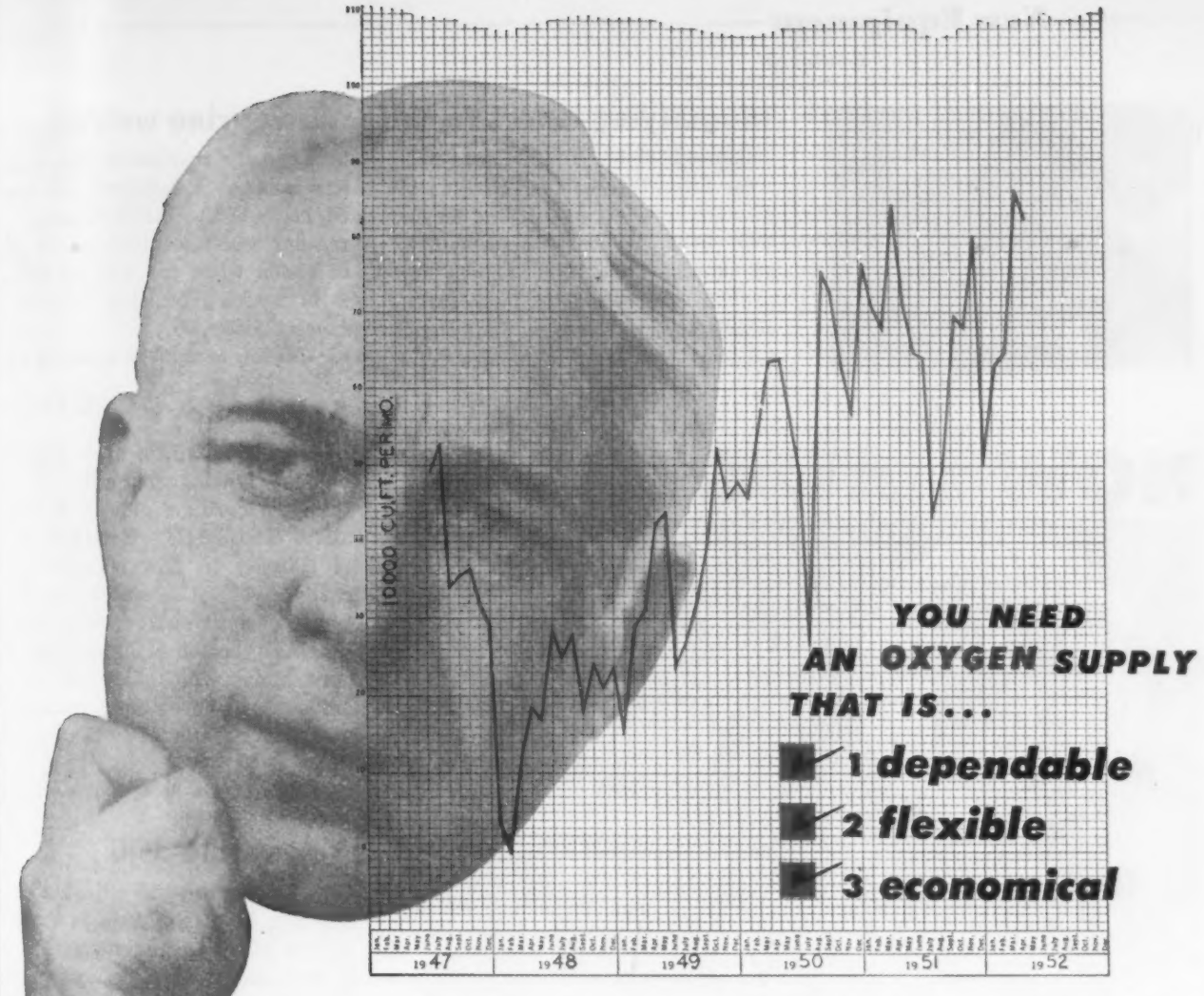


400 brake shoes broached per hour

As a means of reducing loading and unloading time to a minimum, and thereby speeding up the broaching operation on automotive brake shoes, pneumatic positioning and hydraulic clamping are combined on the shuttle fixture of this broaching machine. The machine is a standard Colonial dual ram 10-ton 54-in. stroke, with specially designed shuttle fixtures. Insert type broaches cut a slot at one end and a concave at the other at a rate of 400 brake shoes per hour. Single manual control of three pneumatic cylinders enables the brake shoe to be positioned accurately against three stops with a flick of the control lever. Release of the part is just as fast, after broaching. Hydraulic clamping is an integral part of the automatic broaching cycle. Stock removal on both the ½-in. slot and the 13/32-in. concave is 13/32 in. maximum. Thickness is 13/32 in. at the concave and 3/16 in. at the slot. *Colonial Broach Co.*

For more data circle No. 23 on postcard, p. 87.

Turn Page



YOU NEED AN OXYGEN SUPPLY THAT IS...

- ✓ 1 dependable
- ✓ 2 flexible
- ✓ 3 economical

1 If a complete or partial failure in your high-purity oxygen supply would hurt your production — you need a *dependable* supply. Airco can meet your demands for high-purity oxygen when and where you need it. Our vast network of plants in industrial areas is backed by adequate storage facilities, and a fleet of oxygen delivery trucks.

2 If your oxygen consumption varies like the typical example shown — you certainly need a *flexible* supply. You can meet peak requirements without the cost of extensive storage facilities — yet pay only for the exact amount you need when the demand lightens, without the many costs of idle capacity — by buying Airco oxygen.

3 No matter how much oxygen you use — you want an *economical* supply. Airco oxygen of a uniform high-purity is produced in volume for a nation-wide market — to give you, the individual user, low cost.

Call or write your nearest Airco office for help in planning the most economical oxygen supply for your needs. Airco specialists can help you *use* oxygen most efficiently, too.

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at the frontiers of progress you'll find

AN AIR REDUCTION PRODUCT

Magnifying lenses for bifocal-wearing welders

Improved vision for welders who wear bifocal glasses is provided by new Ortho-Weld magnifying lenses. The precision lucite lenses will fit all standard welding helmets and provide comfortable close-up vision at any angle. The lense is inserted between the regular helmet filter lens and the rear cover plate of the lens holder. Magnification is needed because the bifocal segment of regular glasses is out of the line of vision when the welding helmet is in working position. *Bausch & Lomb Optical Co.*

For more data circle No. 24 on postcard, p. 87.

Silver alloy

Low melting silver alloy features unusual flowing characteristics on tungsten carbide, difficult to braze alloys and steels. EutecRod 1602 is claimed to flow smoothly and easily even at elevated temperatures, permitting the use of silver brazing-type joints on all tough-to-bond alloys which have refractory oxides of chromium, vanadium nickel, etc. *Eutectic Welding Alloys Corp.*

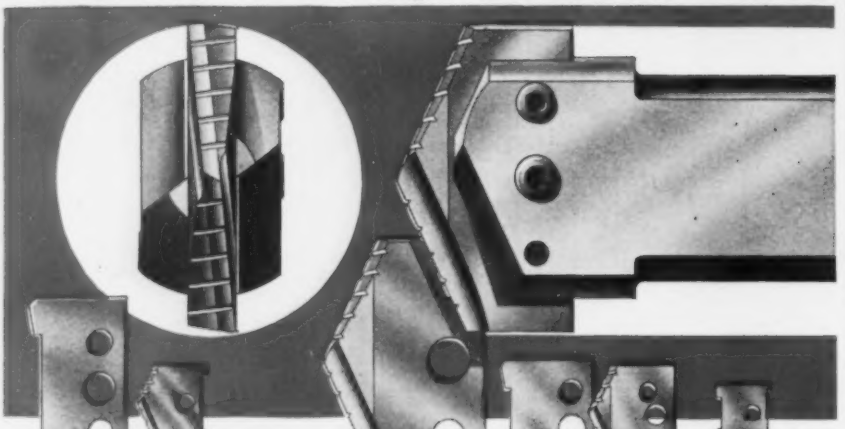
For more data circle No. 25 on postcard, p. 87.

Adjustable drill

Newly designed drill adjusts to cut any size hole from 2 to 3 in. with one set of blades and any size from 3 to 4 in. with a second set of blades. In addition it will cut oversize for clearance or under size for press fits. A scroll ring engaging the bottom sides of the blades performs the double function of adjusting the blades and supporting them against the thrust of the cut. The drill finds its greatest value when used on drill presses and radials, where its balanced cuts work with the normal spindle construction of such machines. *Hayden Twist Drill Co.*

For more data circle No. 26 on postcard, p. 87.

NOW made by GAIRING



Drill Large Holes from the Solid with Interchangeable Spade Drills

Made in 256 cutter sizes, 1 to 5 inch diameter, in steps of 1/64, Conner type Spade Drills drill the required diameter in one operation, need no retracting to clear them of chips. Only eight sizes of holders are needed to handle all cutter sizes.

For general purpose work and in the Tool Room, use the cutter and holder assembly shown above. It is a rugged tool of great rigidity, recommended for large holes of medium depth.

For Production Drilling (for repetitive work), and for the somewhat deeper holes, use Conner type Oil Hole Holders designed for easy coolant flow and fast chip expulsion.

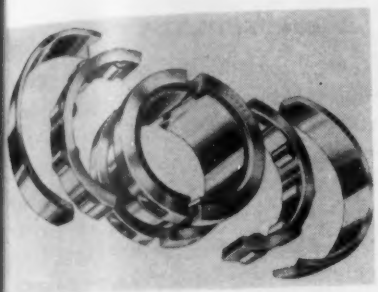
For Boring: Core Drill Cutters, for semi-finishing of cored and drilled holes, are made in the same 256 sizes, to fit the same spade drill holders.

The Gairing Tool Company is now the exclusive manufacturer of the Spade and Core Drills, both standard and special, formerly made by the Conner Tool & Cutter Company.

Send for Catalog and Price List

GAIRING TOOLS

The GAIRING TOOL COMPANY • 21224 Hoover Road • Detroit 32, Michigan



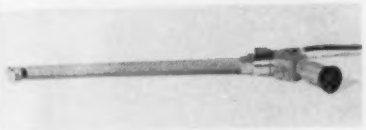
Split roller bearings simplify location problems

Use of split roller bearings brings added maintenance economy and machine efficiency to any roller bearing application because the split design permits an anti-friction roller bearing to be assembled around the shaft. The bearings are split right down to the shaft; can be applied where it is impossible to mount conventional type solid ball or roller bearings. Races and rollers are high carbon-chrome alloy steel, through-hardened for strength and maximum loads. *Copper Split Roller Bearing Corp.*

For more data circle No. 27 on postcard, p. 87.

Inside inspection

Inspection of interior surfaces, hard-to-reach areas such as between walls, back of dividers and inside tubular and cylindrical construction, machines, etc., is possible with a new precision instrument, called Inspecto-Scope, that measures 17 in. overall. The straight tube that carries light is 12 in. long. Tip



of the tube carries a 1.5 v GE bulb, with a reflector that picks up image and carries it up through the tube to the eyepiece. This lighted image is magnified five times. A focusing mount provides for maximum sharpness. Tube rotates 360° permitting viewing walls of cylinders and tubes without turning the object or changing the eye position. *Badger Sales Co., Inc.*

For more data circle No. 28 on postcard, p. 87.

Furniture tubing

For the light metal furniture manufacturing industry, a new furniture tubing of aluminum has extremely close inside-diameter and wall-thickness tolerances, desirable surface characteristics, good formability, uniform fine grain structure and high corrosion and acid resistance. The tubing will take short radius bends and undergo severe plastic deformation without losing its surface attractiveness. Pieces can be buffed prior to forming without unsightly surface granulation. It is claimed the new product will reduce manufacturers' raw material costs, cut down fabrication operations. *Harvey Machine Co., Inc.*

For more data circle No. 29 on postcard, p. 87.

Turn Page

"Electro" field men are fully capable of specifying or assisting in specifying all types of grinding wheels. They are competent to run tests. And they can take full charge of all phases of any customer's grinding wheel requirements and problems.

Here is a broad, job-side service with a definite objective . . . that of delivering to you specific-purpose grinding wheels.

At no obligation or cost to you, write us to send a technical expert for consultation to your plant, or phone us, or wire.

Electro Refractories & Abrasives Corporation, 344 Delaware Ave., Buffalo 2, N. Y. • Manufacturing Plants: Buffalo, N. Y. Electric Furnace Division, Cap-de-la-Madeleine, P.Q., Canada • Warehouse, Los Angeles • Grant S. Diamond, President.

Electro TRADE MARK SINCE 1919

GRINDING WHEELS
resin — vitrified

K-438

—New Equipment—

Continued

Wheelbrushes

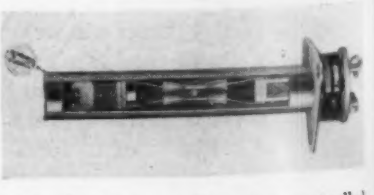
Longer brush life, increased maximum wheel speeds, insured balance and extra safety are advantages of new design features of the Fullanchor wheelbrush. As the trim wears down, larger sideplates can easily be exchanged for smaller ones, exposing a new length of trim and greatly increasing the

life of the brush. Brush balance is achieved by clamping an almost identical number of filaments in each tuft, then anchoring each tuft to the core with evenly spaced wire staples driven through a continuous steel channel. Wheel brushes can be used either singly or in multiple units. *Fuller Brush Co.*

For more data circle No. 30 on postcard, p. 87.

Heat control

A rate-of-rise thermostat is designed to control the rate of heating and prevent hazardous temperature overshoots in fast warm-up systems. When used in series with a temperature controller, the unit brings the system up to temperature from cold start at any



rate desired. After the controlled warm-up period, the standard temperature controller takes over and the rate-of-rise becomes a safety check. *Fenwal, Inc.*

For more data circle No. 31 on postcard, p. 87.

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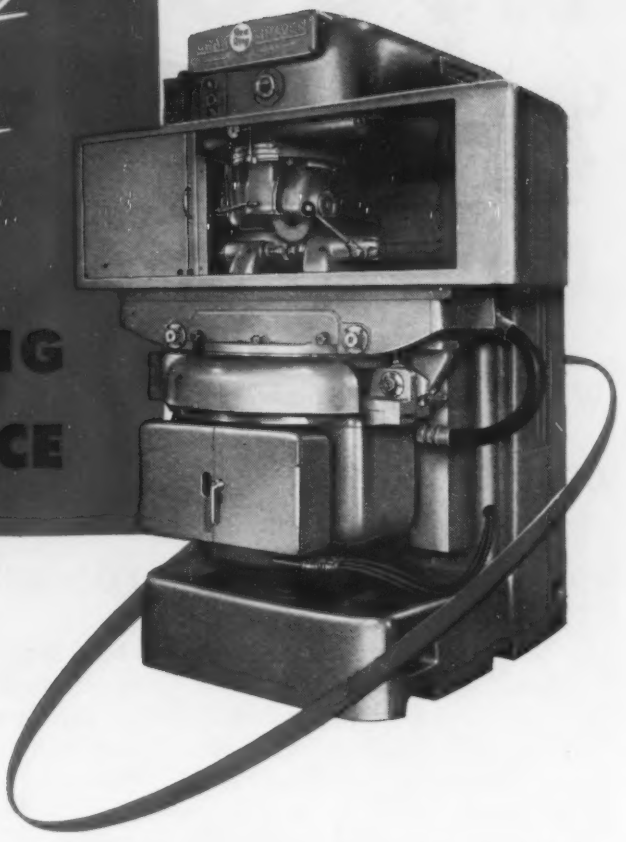
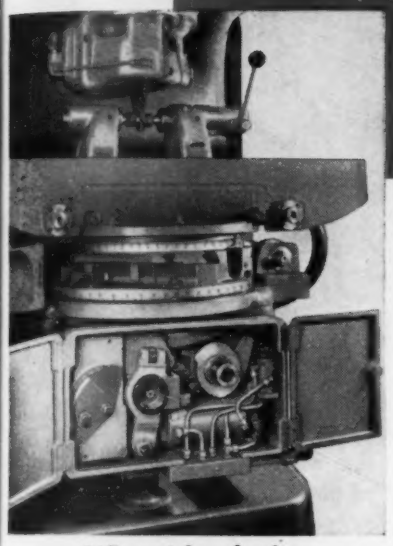
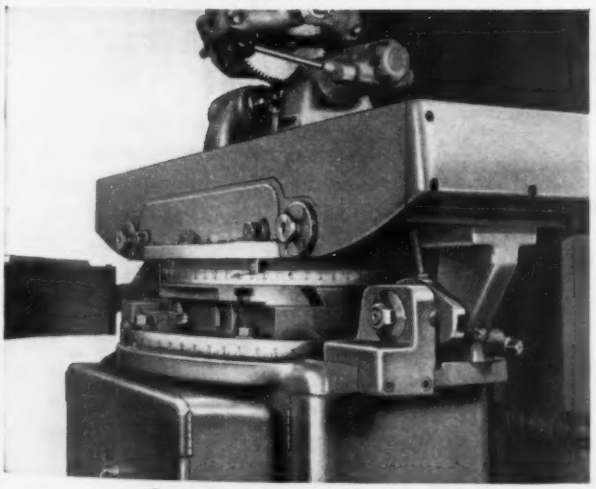
An Important Contribution To GEAR SHAVING PRACTICE





Differential up-feed mechanism



Crowning cam and bracket

Two new features are now optionally available with the Red Ring Gear Shaving Machine Model GCU — Automatic Differential Up-feed and Conventional Crowning. So equipped, any of the recognized processes in the field of rotary gear shaving may be performed on this machine. It thus becomes economically applicable to both high production and to job shop operations and to gears of all characteristics within its size range.

Specifically the Model GCU with these additions can be used for:

(1) Diagonal shaving at fixed center distance on a two stroke cycle.
(2) Diagonal shaving on an automatic multi-stroke cycle with selected increments of up-feed and dwell.
(3) Conventional shaving on an automatic multi-stroke cycle with selected increments of up-feed and dwell.
(4) Precision gear crowning accomplished by rocking the table during any conventional shaving cycle.
(5) Taper shaving to specification.

Automatic cycling is precise and very fast. Production rates are high and cutter life has been increased to as much as 200%.

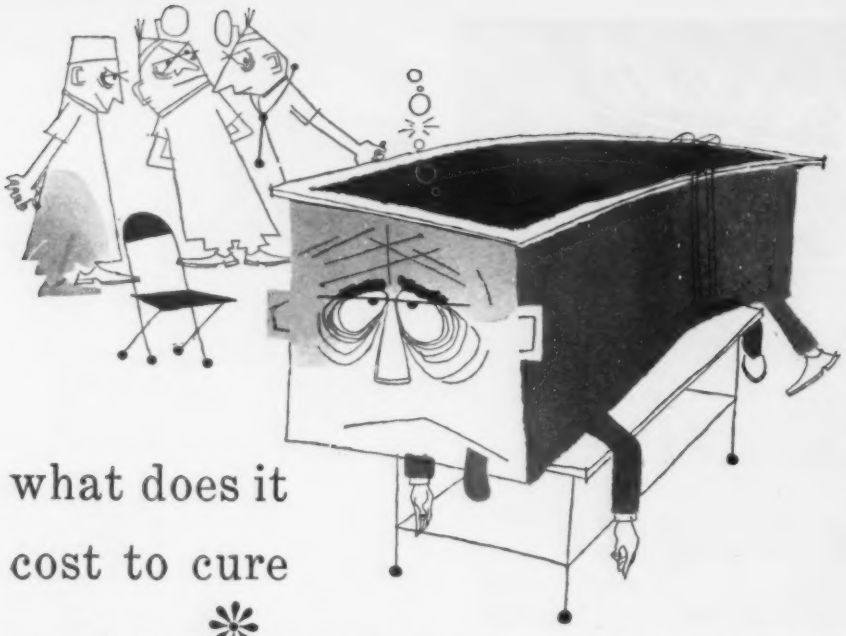
Write for Bulletin S53-7 which gives all the details of this important new development.

6501

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



what does it
cost to cure
✻
coil-itis in your processing tank?

The constant care it takes to keep tanks operating when they're plagued with coil-itis is extremely costly. Downtime, and all the other maintenance time, slow heating and cooling ills of using old-fashioned pipe coils can be cured with Platecoils.

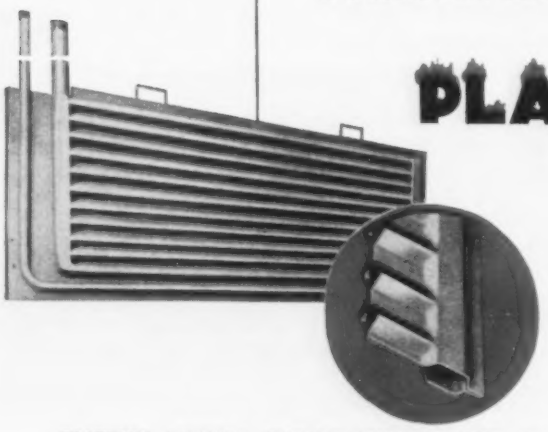
As revolutionary as the new wonder drugs, Platecoils save as much as 50% in initial cost. They take 50% less space in the tank. They simplify maintenance and save hours of downtime. Compared to the hours it takes to clean and replace pipe coils, Platecoils can be cleaned and replaced in no time at all . . . without dumping the solution.

It costs less to cure coil-itis with Platecoils than to suffer its evils. **Write for bulletin P73 today!**

PLATECOILS SAVE 50% IN HEAT TRANSFER COSTS

PLATECOILS COST LESS TO BUY, INSTALL, MAINTAIN

The Newcomb-Detroit Co., Grand Rapids Division, has found it is less costly to buy, install and maintain Platecoils than to fabricate pipe coils in their own plant. Ask about other case histories.



PLATECOIL

REPLACES PIPE COILS

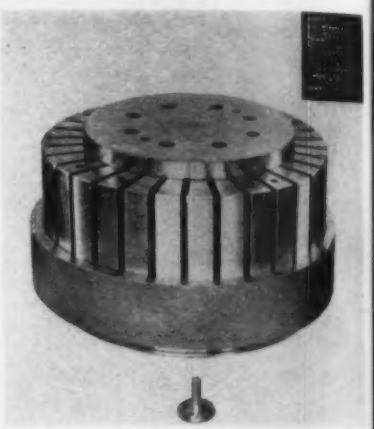
✻

Coil-itis — Diagnosed as tank heating and cooling problems. Platecoils — the prescription for solving pipe coil problems.

PLATECOIL DIVISION, TRANTER MANUFACTURING, Inc., LANSING 4, MICHIGAN

Expanding Mandrels

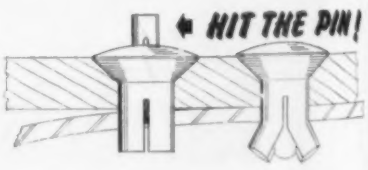
Used wherever dimensions must be held accurately concentric with the ID, Erickson self-releasing expanding mandrels are guaranteed precise to 0.0005 in. The smaller of the illustrated mandrels handles work ranging from ½ to ⅝ in. ID. The larger is used for work starting with a a 15-in. bore, such as rotors, impellers. Each Erickson sleeve expands over a range of 1/32 in. and each shank accommodates a number of sleeve sizes. *Erickson Tool Co.*



For more data circle No. 32 on postcard, p. 87.

Blind rivet

Designed for installations where a finished head appearance is of importance, the new oval-head countersunk drive rivet is offered as a blind fastening to wood or metal. It is capable of application from one side of the job, permits unusual assembly speed, and attaches with a high degree of pull-up exerted in bringing parts together. Drive rivets are installed with an ordinary hammer. The pin expands four prongs to form a blind head against interior surface. *Southco Div., South Chester Corp.*



For more data circle No. 33 on postcard, p. 87.

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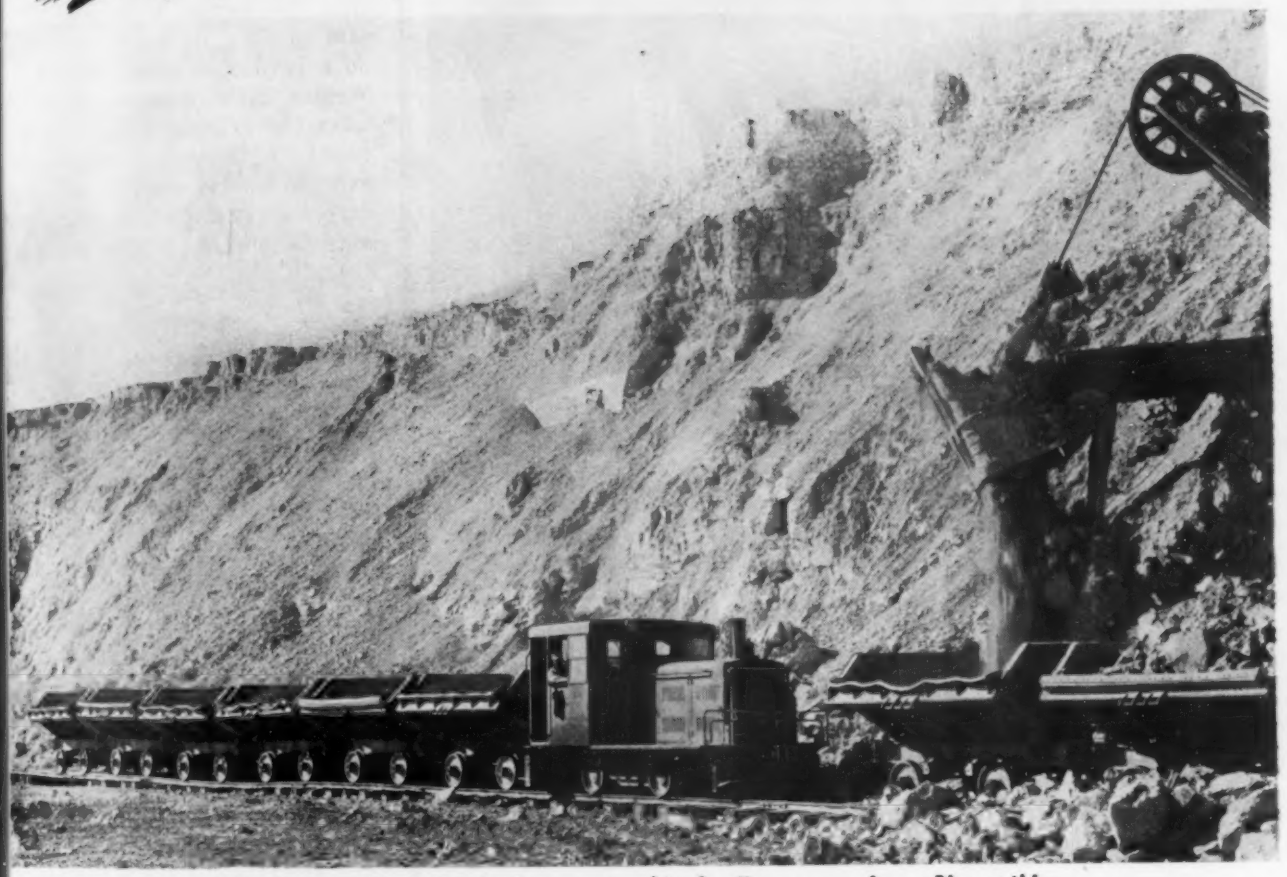
PLYMOUTH

MOVES MOUNTAINS!



Here's proof that jobs don't come too big for Texans—*or for a Plymouth!*

Down in Texas a mountain of rock—or nearly that much—is being hauled away by the Longhorn Portland Cement Company. Prime mover in this big rock haul is an 18-ton Plymouth Locomotive. Checking up on how it performs, we contacted Gaines Voight, Chief Engineer on the job, and he had this to say: "The simplicity of its operation is what appeals to our operator —and as for me—well, the overall efficiency of our Plymouth is what I like. We've been using locomotives here since 1929, and in my opinion, this Plymouth is a very excellent machine. We've had it 2½ years and operate it 168 hours a month. Time spent for maintenance and repairs has been negligible."

To cut costs and enjoy similar satisfaction in your own hauling, switching, and spotting operations, PULL WITH PLYMOUTH.

Plymouth models range from 3-ton to 70-ton sizes for narrow and standard gauge track. Your choice of Plymouths includes: Gasoline and Diesel Mechanical, Gasoline and Diesel Torqomotive*, and Diesel Electric. Send for the latest Plymouth catalog. PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-2, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

WITH TORQOMOTIVE DRIVE*

*Torqomotive: Plymouth transmission with hydraulic torque-converter

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

F.O.B. MADISON, WISCONSIN...

packing time cut 60%
materials cost cut 17%
shipping weight cut 9%

With General Engineered Containers

Wherever these giant cylindrical pressure sterilizers are going, it costs less to ship them. General container engineering cut material cost $2.00, saved 70 minutes packing time and reduced shipping weight 42 lbs. on this hard-to-pack item . . . and this is only 1 of 12 cost-cutting containers we have helped to create for Ohio Chemical and Surgical Equipment (a Division of Air Reduction Company, Inc.) since 1949.

Whatever your packaging problem, military or civilian, General Box Company's two fine packaging laboratories and trained packaging experts stand ready to help you solve it. Find out how *you* can cut costs. Write for complete details.

Find out how other manufacturers are cutting container costs. Write for your free copy of "The General Box."

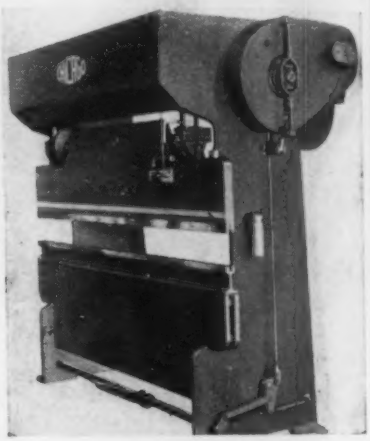
General Box COMPANY
★ ★ ★ ★ ★
1873 Miner St., Des Plaines, Ill.

Factories: Cincinnati; Denville, N. J.; Detroit, East St. Louis, Kansas City, Louisville, Milwaukee; Prescott, Ark.; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston

ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED
• Generalift Pallet Boxes • Corrugated Fiber Boxes • All-Bound Boxes
• Cleated Corrugated and Wolkins-Type Boxes • Wirebound Crates and Boxes

Light duty brake

Because of a variable speed drive and other features for a light-duty press brake of its capacity and size, this Series A press brake is said to offer increased production on a variety of sheet metal work. Welded plate construction maintains the original precision alignment. A twin-plate bed provides extreme lateral rigidity, minimum deflection, and a 1¼-in. slug clearance on multiple punching. Variable speed drive (infinitely variable between 20 to 50 strokes per min) permits selection of the speed to suit the work, skill and speed of operator. Press brake is available in 3 sizes with capacities of 54 in. x 10 gage to 120 in. x 16 gage. *Dreis & Krump Mfg. Co.*



For more data circle No. 34 on postcard, p. 87.

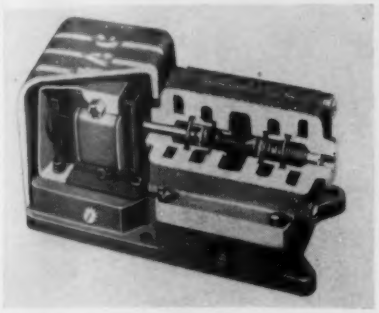
Electrolytic cleaner

More thorough removal of stubborn and heavy deposits of organic and inert foreign matter from metal surfaces preparatory to plating is facilitated by use of Klem cleaner 197. The cleaner is for use on ferrous metals and may be used with either direct or reverse current. Polishing and tumbling compounds that harden and are difficult to remove from pits and crevices are among the types of soil more readily freed by the gasses when 197 is added in concentration of 2 to 8 oz to the gallon of water. *Klem Chemicals, Inc.*

For more data circle No. 35 on postcard, p. 87.

Air valve

Basic design of an improved solenoid operated air valve embodies an aluminum alloy, surface hardened spool, on which the sealing material is integrally molded and bonded. These seals enter the precision finished, bearingized and



highly polished bores of body and retainers to effect instantaneously positive sealed-with-air-pressure seal. Feather-like contact of Mac seal on a wearing surface assures long life to this one wearing part. Downtime is minimized due to simplicity of maintenance. *Mechanical Air Controls, Inc.*

For more data circle No. 36 on postcard, p. 87.

Operational recorder

Multiple recording of process timing is the function of this new instrument. It is electrically driven by a synchronous motor and consists of a metal stylus which traces

a continuous record on a pressure-sensitive paper chart for a 7-day period. The stylus is capable of tracing three positions. Uses include monitoring unattended equipment; time variable recording of automatic control systems in metal and chemical processing industries. *Librascope, Inc.*

For more data circle No. 37 on postcard, p. 87.

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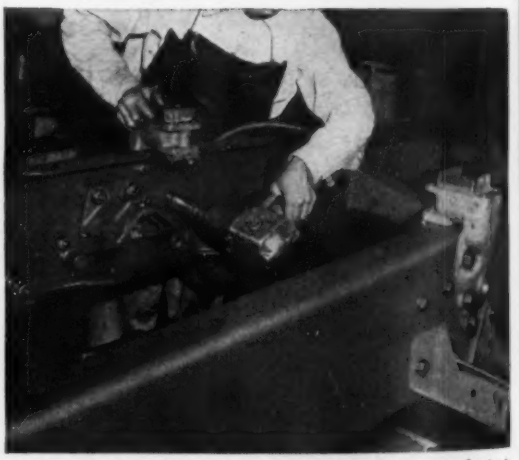
Two Autocar engineers took off on a coast-to-coast run to shake the bugs out of a new test model. Things went well until a riveted spring bracket broke. It took an entire day just to chisel through the rivets because it was hard to get at the bracket.

From that day on, it was *accessible* bolt-and-nut construction exclusively for all Autocar trucks. And Autocar standardized on RB&W bolts. One dividend from using these rugged bolts is that Autocar can specify higher-strength material than is practical for riveting. Furthermore, tests on structures like bridges show that rivets frequently loosen. This doesn't happen to bolts on Autocar frames.

Where you want to join structural members firmly together so they'll *stay* together for good, high-strength bolting is often your best bet.

As the leading manufacturer of all kinds of fasteners, we're in the unusual position of always being able to recommend and supply the right ones for all your needs. Write to RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N. Y.



FASTER FASTENING is achieved in the Autocar plant at Ardmore, Pa., by using air tools like the one shown here to run up RB&W nuts on RB&W bolts on an Autocar truck frame. In addition to making tight, accessible joints, bolting effects substantial assembly savings. 21

RB&W

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The Iron Age

SALUTES

Ludwig Stettner

His own sad experience convinced him of the need for better, safer welding torches, equipment.

LUDWIG STETTNER had plenty of irons in the fire for years. But it took a gas explosion which cost him an eye to really start him blacksmithing.

While lying on a hospital bed in 1913 recovering from the blast, Mr. Stettner designed the Victor welding torch, first of its type which wouldn't backfire. After recovering he reorganized his welding shop to produce the unit.

Today the San Francisco firm under Mr. Stettner, just rounding out 40 years with it, has extended its basic line to include cutting torches, hard facing rods, gas manifolds, medical therapy units and sand blasting nozzles. Assembly plants are in Los Angeles and Chicago. Distribution of arcwelding equipment is also carried on.

Building the company was formidable. He had to convince firms to set up their own welding departments, then buy his equipment. But trouble was nothing new to him.

In 1906, while an ornamental iron worker in his native Germany, an explosion nearly blinded him. Recovery was long. In 1910 he became a Cuban fruit grower. Wiped out the first year by a hurricane, he went to San Francisco where he resumed blacksmithing, shortly set up his own small firm. Then came the second explosion and design of the non-backfiring welding torch.

Today at 65 he still adheres to tough schedules, running the company in a highly competitive field. After explosions and hurricanes, though, it isn't as tough as it looks.

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The Iron Age

INTRODUCES

J. H. Babcock, appointed vice-president, HOOKER ELECTROCHEMICAL CO.: and **Dr. J. H. Bruun**, appointed director of research and development.

S. M. Jenks, appointed assistant executive vice-president, Operations—UNITED STATES STEEL CORP., New York; **John H. Elliott**, appointed vice-president, Operations — Steel; and **E. H. Gott**, made general manager, Operations—Steel.

Elmer Milby, elected vice-president, WEST VIRGINIA STEEL & MFG. CO., Huntington, W. Va.

John E. Brennan, appointed to the executive staff of the president and vice-president and general manager, Dodge Div., CHRYSLER CORP.

Matthew M. Lawler, elected vice-president in charge of the air conditioning and Refrigeration Div., WORTHINGTON CORP., Harrison, N. J.

J. H. Matthews, appointed executive vice-president, RAYBESTOS-MANHATTAN, INC., Passaic, N. J.

Paul Nesbit, appointed a board member and elected treasurer, CABLE-LINK CORP., Detroit.

N. Rulison Knox, appointed assistant to the chairman, POOR & CO., Chicago.

Howard W. Hoffman, appointed controller, PENNSYLVANIA FLEXIBLE METALLIC TUBING CO., Philadelphia.

C. B. Smythe, elected to the board of directors, GREGORY INDUSTRIES, INC., Toledo, Ohio.

Arthur M. Rothman, appointed district sales engineer, AMERICAN SILVER CO., INC., Flushing, N. Y.

Paul Ascenzo, appointed sales engineer, New York territory, LACLEDE ARCH CO.

Robert M. Barnum, appointed sales engineer, Southern Michigan area, UNION TWIST DRILL CO.

John H. Harper, appointed chief staff engineer, Riverdale plant, Riverdale, Ill., ACME STEEL CO.

Charles E. Schmitt, named Ohio sales engineer, ACE CENTRAL STATES MACHINE TOOL CO., Detroit.

Delton Ezell, appointed in charge of research and manufacturing, UNION CHEMICAL CORP., Newark, N. J.

Rankin H. McDaniel, made assistant general production superintendent, San Diego plant, SOLAR AIRCRAFT CO.

A. H. Candee, appointed motive power consultant, THE NATIONAL SUPPLY CO., Pittsburgh.

Paul H. Nast, appointed manager, Rock Drill Div., DAVEY COMPRESSOR CO., Kent, Ohio.

Warren Bohner, named manager of pricing, CATERPILLAR TRACTOR CO., Peoria, Ill.

W. L. Pinner, appointed manager, Process Development Div., HOUDAILLE-HERSHEY CORP., Detroit.

John Reich, promoted to factory manager, HYSTER CO., Danville, Ill., plant.

P. L. CODDINGTON, appointed assistant to the president, Alloy Tube Div., The Carpenter Steel Co., Union, N. J.

RAYMOND N. GRUBER, named director of marketing research, Standard Pressed Steel Co., Jenkintown, Pa.

ROGER E. BREMER, promoted to assistant to the president of planning and programming, Packard Motor Car Co., Detroit.

Personnel

J. H. Lewis, appointed manager, Erection Dept., PITTSBURGH BRIDGE & IRON WORKS, Pittsburgh.

Arthur L. Foltz, Jr., appointed manager, Detroit District office, DE LAVAL STEAM TURBINE CO., Trenton, N. J.

Charles J. Betz, promoted to sales manager, Unbrako Line, STANDARD PRESSED STEEL CO., Jenkintown, Pa.; **John W. Breitmayer**, becomes assistant sales manager.

Frank W. Walker, promoted to regional sales manager, MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.

Russell J. Dickson, appointed general sales manager, Leschen Wire Rope Div., H. K. PORTER CO., INC., St. Louis.

F. W. Borchers, appointed general sales manager, THE BRISTOL CO., Waterbury, Conn.

W. D. Sullivan, transferred to regional manager, Boiler Div., Manufacturing Dept., THE BABCOCK & WILCOX CO., Beaver Falls, Pa.

Edmund J. Klonowski, promoted to general sales manager, all divisions, PIVOT PUNCH & DIE CORP., North Tonawanda, N. Y.

Edward J. Baxter, appointed works manager, Marion, Ohio plant, THE POLLAK STEEL CO.; **R. H. Knecht**, named manager of production planning; **J. H. Rech**, becomes director of facilities and mechanical development; and **L. Cummins, Jr.**, becomes chief industrial engineer.

D. J. Bracken, appointed general manager, Lincoln-Mercury Div., FORD MOTOR CO.

D. R. Nighswander, appointed assistant to the general sales manager, THOR CORP., Chicago.

John F. Scherer, appointed dealer sales manager, Dudco Div., THE NEW YORK AIR BRAKE CO., Hazel Park, Mich.

FREDERICK J. RUEGER, appointed director of cost planning, all divisions, Pivot Punch & Die Corp.

R. L. MOORE, appointed sales engineer, Chicago office, The Cooper-Bessemer Corp.

WILLIAM R. STAPLES, promoted to manager of sales, The Carpenter Steel Co., Alloy Tube Div.

RICHARD J. RAND, appointed assistant manager, Cincinnati, Crucible Steel Co. of America.

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Here's one you'll want to bite on! It's Formbrite

Upper lure is Formbrite. Lower one is made of ANACONDA Fancy Pattern Embossed Brass.

FISH find this particular line of brass spinners so attractive that fishermen's demands have built annual sales of the Aeroplane Tackle Manufacturing Company of Denver to more than two million lures of all types.

The high finish on the spinner is part of the secret. While the cost of producing this is of no interest to the fish, it is to the manufacturer. Recently all brass orders were changed to Formbrite*, the superior ANACONDA Drawing Brass that has enabled this firm to cut polishing costs over 25%, and on several stamped products to produce the required finish by tumbling only prior to lacquering or plating.

Formbrite, with its superfine grain, provides a surface far superior to ordinary drawing brass. It is stronger, harder, more scratch-resistant than ordinary brass, yet retains remarkable ductility for forming and drawing. It's a premium product at a non-premium price. If these features lure you, we should like to show you how this better brass can cut your product's finishing costs. Or write for Publication B-39 to *The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.*

Thirty-five years ago a fisherman, disgusted with his luck, cut up an old brass bait box to make himself a spinner resembling an old-time airplane propeller. Both fish and fisherman liked it so much, he started what is now a big and thriving business.

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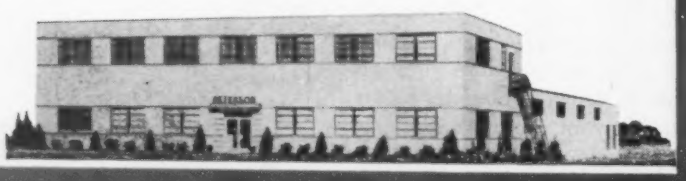

PETERSON STEELS, INC.

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Personnel

Continued

A. H. Davis, appointed works manager, THE R. K. LEBLOND MACHINE TOOL CO.

Charles C. Rieth, joins the staff of the NATIONAL LEAD CO., and the Nickel Processing Corp.

George F. Shaver, promoted to branch manager, PACIFIC AIRMOTIVE CORP., Seattle.

E. W. Gutgsell, named midwest division sales manager, CORY CORP., Chicago.

Arvin W. Harrington, named sales representatives, N. Y. and Conn., Alloy Tube Div., THE CARPENTAR STEEL CO.

OBITUARIES

Bradford C. Colcord, retired president, Woodward Iron Co., in Birmingham recently.

J. M. Morrow, vice-president in charge of sales, Dayton Steel Foundry Co.

Donald H. Montgomery, 57, vice-president and director, The New Britain Machine Co., New Britain, Conn., at his home in Farmington, Conn., after a short illness.

Max Kuniansky, executive vice-president and general manager, LYNCHBURG FOUNDRY CO., Lynchburg, Va.

Charles H. Hilton, 80, former treasurer, American Cast Iron Pipe Co., recently in Birmingham, Ala.

William F. Boore, 67, sales coordinator, Nichols Wire & Aluminum Co., Davenport, Iowa, suddenly.

Fred C. Young, 60, manager of sales, Union Drawn Steel Div., Republic Steel Corp., at Massillon, Ohio, recently after a short illness.

Harold J. MacDonald, 54, government sales manager, Electrical Wire & Cable Dept., United States Rubber Co., New York.

Improve Your Soldering WITH NONCORROSIVE FLUX

By W. S. Gale
Special Assistant to Vice-President
McCord Corp.
Detroit.

◆ Aluminum, as well as other metals, can now be soldered reliably and safely in production using a new series of fluxes developed by McCord Corp. of Detroit . . . The fluxes remove oxides and other interferring films from aluminum, permitting effective soldering, and have twice the solder spreading action of zinc chloride on copper.

◆ The new fluxes are noncorrosive, leave little or no residue . . . They can be used without hazard to personnel, and are readily applied as water solution or in the form of pastes.

◆ In addition to use in soldering regular copper and brass auto radiators, successful applications include composite radiators with aluminum fins soldered to conventional brass water tubes, electronic equipment, carburetor floats, electrical wiring, and battery cables.

◆ NEW ECONOMIES in production of soldered components, and a whole new range of soldered aluminum applications have been made possible through development of a group of noncorrosive soldering fluxes by McCord Corp., Detroit. Suitable for volume production, the new fluxes are the fruit of a 6-year research program on flux soldering problems. They depend for their unusually effective action on hydrazine, a war-born chemical used by the Germans as a rocket fuel.

The most effective and widely used soldering flux, until recently, has been zinc chloride. However, zinc chloride has several disadvantages, and among these are its corrosiveness and its inability to permit the soldering of aluminum.

McCord Corp., Detroit, began a systematic search for solutions to the problems presented by use of corrosive zinc chloride soldering fluxes in the manufacture of automotive radiators.

Convinced by hundreds of tests that the corrosive flux residues could not be completely removed by practical washing methods, McCord attacked the problem from a different direction. A soldering flux which would leave no residues at all was sought. Such a flux would have to be as effective as zinc chloride in soldering and yet be completely non-corrosive.

A research program to develop an effective noncorrosive flux was initiated in 1947. A study

Tests show that hydrazine fluxes have much greater solder-spreading action than zinc chloride . . . Excellent soldering has been obtained and no corrosive residues were left on the metals . . .

of the literature disclosed thousands of technical articles and patents concerned with soldering.

Many so-called noncorrosive fluxes had been advocated in the past to replace zinc chloride.

The more promising of these were tested: The conclusion always confirmed that none was as effective as zinc chloride.

One of the prerequisites of soldering is the formation of an alloy system between the solder and the metals being joined. To accomplish this, the surfaces of the metals to be joined must be chemically cleaned during soldering to remove completely any interfering films or oxides.

A fluxing agent is usually required to prepare the metal surfaces. Zinc chloride or mixtures of zinc chloride and ammonium chloride have been used for this purpose for centuries.

When zinc chloride fluxes are heated during soldering, water is driven off, depositing the flux salts. Further heating causes these salts to melt. While molten, the salts have ability to dissolve oxides and other interfering films from the surfaces of a number of metals.

The molten salts maintain a protective coating over the heated metal surfaces which prevents the oxide films from reforming. The solder, when melted, displaces the fused flux from the metal surfaces and alloys with the metals being joined.

Zinc chloride, as a flux, has some objectionable characteristics. Foremost among these is that zinc chloride deposits fused residues which remain within or surrounding the soldered joint. These residues cause severe corrosion unless quickly removed.

Due to the nature of these residues it is difficult or impossible to remove them satisfactorily. Often their corrosive action cannot be tolerated. Even though every precaution is taken to remove as much of the residues as possible, it is sometimes necessary to resort to washing in dilute acid to remove the more stubborn deposits.

A second major disadvantage of zinc chloride fluxes is that the fumes evolved during soldering have a very corrosive action on jigs, fixtures, and other plant equipment. Furthermore, if improperly used, the raw flux and its fumes may constitute a health hazard.

What is the perfect flux?

Zinc chloride fluxes are by no means universal in the sense that they cannot be used effectively to promote the soldering of many common metals and alloys. For example, they will not remove the oxide coating from aluminum.

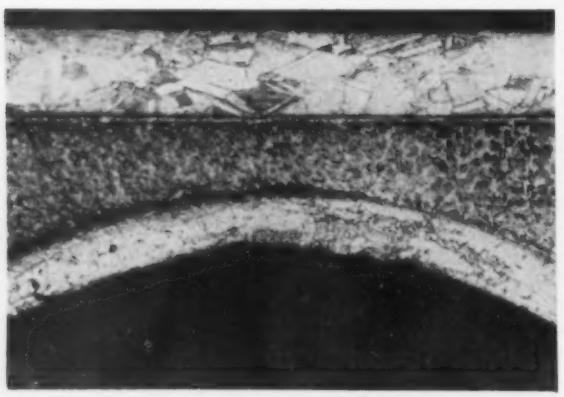
To define research goals requirements for a perfect soldering flux were listed, as follows:

1. Should be molten at temperatures below the solidus temperature of the solder and should remain in a fused condition throughout the plastic range and until the molten solder has ceased to flow.

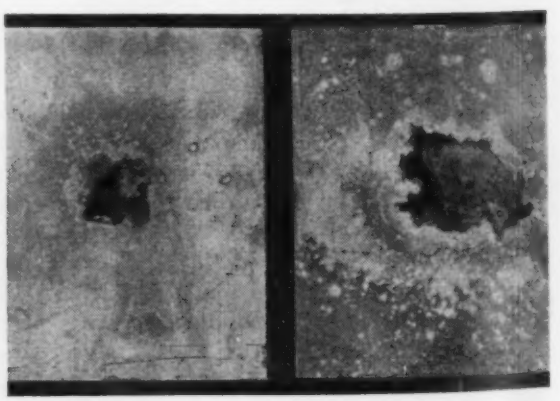
2. Should be capable of removing oxides and other interfering films from the metals to be joined by reacting with these oxides, films, and coatings, either to dissolve, reduce, or deterge them.

3. Should prevent reoxidation of the metal surfaces during soldering.

4. Should be capable of being displaced from



BRASS SOLDER COPPER system obtained using the new flux is shown in this photomicrograph. Brass and copper are 0.005 in. and 0.003 in. thick respectively.



MORE THAN TWICE the spreading area of solder on brass is possible with new fluxes as compared with zinc chloride fluxes. The noncorrosive fluxes are based on hydrazine.

the metal surfaces by the solder and should serve to reduce the surface tension of the molten solder.

5. Should leave no residues within or surrounding the soldered joint which would promote corrosion of the joint or the bonded metals.

6. Use of the flux should introduce a minimum of health hazards.

While it might not be possible to meet all these requirements successfully in one flux, it was hoped one composition could be found which would represent the best compromise of all of the important basic requirements established.

Hydrazine fluxes fill bill

Eventually, a flux was developed possessing all of these characteristics to a marked degree. It depended for its fluxing action upon the use of compounds of hydrazine, N_2H_4, a chemical which had literally rocketed into prominence during World War II when the Germans used it as a rocket fuel.

The new hydrazine fluxes proved considerably more effective than zinc chloride in the soldering of copper and brass. For example, a common method of evaluating flux effectiveness is to measure the area over which a small pellet of solder will spread on a metal panel which has been fluxed and heated on a hot plate.

Carefully controlled tests showed hydrazine fluxes had, in some cases, more than twice the solder-spreading action of zinc chloride.

A few radiators were manufactured from copper and brass using the new hydrazine fluxes. Severe testing showed that excellent soldering had been obtained and that no corrosive residues were left on the metals.

When the new flux is heated to soldering temperature, the hydrazine compounds decompose harmlessly into nitrogen and ammonia, and no corrosive residues are left behind. Humidity tests revealed that hydrazine fluxes satisfied the requirements set forth in the Army and Navy specifications for neutral or noncorrosive fluxes.

The hydrazine soldering flux development seemed so significant even in its earliest stages and two U. S. patents were obtained covering the joining, treating and coating metals using hydrazine and its compounds. The hydrazine soldering fluxes were named Coronil soldering fluxes and the process of using them is known as the Coronil soldering process.

McCord does not plan to manufacture or sell the soldering fluxes, preferring instead to make the fluxes and processes available through a licensing program.

With recently added production facilities, the cost of hydrazine has been reduced to the point where many of the Coronil fluxes are competitive with zinc chloride. The savings realized by eliminating washing operations and reducing corrosion of jigs, fixtures, and plant equipment make the new fluxes even more attractive from an economic standpoint.

Has uses for aluminum

The new fluxes and soldering processes have already been used in making over 2 million copper and brass automotive heat exchangers, not only by McCord Corp., but also by the Ford Motor Co.

Early in its studies, McCord discovered the new fluxes could be used to solder aluminum. When the Korean crisis focused attention on the scarcity of copper, the investigation of the soldering of aluminum was accelerated.

In the past, the utility of aluminum has been restricted by the difficulty of joining aluminum to itself and to other metals. There are two reasons for this.

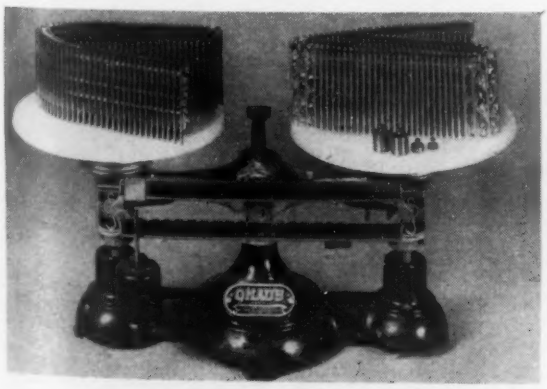
1. The heavy oxide coating normally found on aluminum defies removal by the common fluxes. This made it difficult to weld or braze, and almost impossible to solder.

2. When aluminum is joined to dissimilar metals, conditions are present which may cause galvanic corrosion of the joint or of the aluminum.

Weight savings possible

There is some question as to whether the soldering obtained by any previously known method resulted consistently in the formation of a true alloy, a prerequisite for good soldering. Joints formed by these methods often showed that no alloy was formed, and that the solder was mechanically keyed to the surface of the aluminum.

As a result of its intensive investigation into the aluminum soldering problem, McCord developed several noncorrosive fluxes which permit effective soldering of aluminum to itself and to other metals with a wide variety of solders using many of the common, mass-production soldering methods.



CORRUGATED copper cooling fin, left; and corrugated aluminum cooling fin, right. Aluminum fin section is 1/4 in. wider, more than twice as thick, yet lighter.

There is no need for concern over flux corrosion on the inside of a shell . . . Coronil fluxes are noncorrosive, eliminate washing . . .

McCord engineers believed it might be possible to make radiators with aluminum cooling fins soldered to conventional brass or copper water-carrying tubes. In substituting aluminum for copper in the fins alone, it would be possible to eliminate an average of 8 to 10 lb of copper per radiator. Another advantage of such a composite structure would be that all the surfaces in contact with the coolant would be of the same time-proven metals that have regularly been used. In this way, concern over the electrolytic effect on aluminum of water containing heavy metals would be eliminated.

Improves electronic equipment

The concept of the soldered aluminum-fin radiator has proven to be practical. Test cars equipped with these radiators have been operating for more than a year over thousands of miles. The heat transfer capacities of the aluminum-fin radiators are equivalent to those of the conventional radiators they replaced. Their performance has been checked regularly; not one has been returned for service from the field.

The Coronil fluxes have found important applications outside of the heat exchange industry. They are used to solder parts of heavy-duty electric motors with lead solders containing small percentages of silver.

One supplier of electronic equipment found that use of the fluxes improved his product and reduced production costs. In this case, a terminal board was assembled by inserting hot tin-dipped brass terminals through a plastic panel.

As it was difficult to control the coating obtained on the terminals by hot-dipping, it was decided to stamp the terminals from stock which had been previously coated with tin. This presented a new problem since the edges of the terminals were laid bare in the stamping operation. These exposed edges had to be recoated with tin in an electroplating bath.

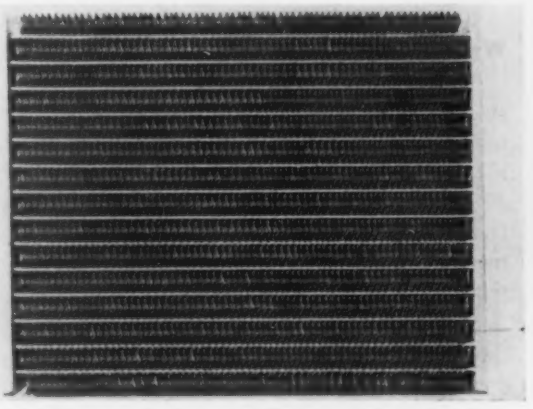
However, the tin coating deposited in the electroplating bath was very difficult to solder. By using a technique developed by McCord the manufacturer fluxed the terminals and allowed them to dry before inserting them into the plastic panel. On drying, the flux formed a protective coating for the surfaces which could be soldered later at any convenient time. The manufacturer of the electronic circuits, upon receiving these boards, made his connections to them without using additional flux simply by bringing the leads to the terminals and heating to soldering temperature.

Noncorrosion a factor

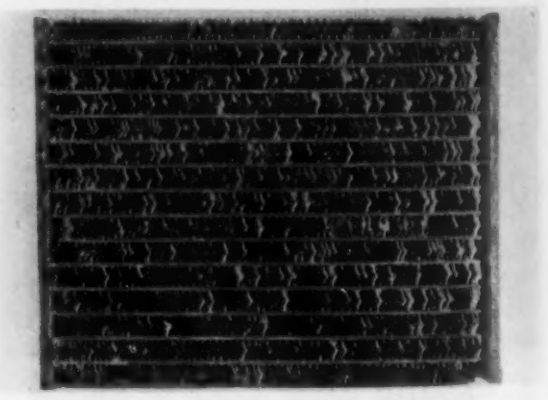
In another case, a manufacturer of carburetor floats found that the zinc chloride flux used to solder the brass floats together often etched pinholes in them. The parts then had to be scrapped. To overcome this problem a complicated washing system was installed. In spite of a 100 pct test of the soldered floats, there was no way of telling whether the inaccessible residues left on the inside of the shell would ultimately corrode through to destroy the float.

Since using Coronil fluxes in this operation, the manufacturer has eliminated the 100 pct test and the costly washing operation. There is no longer any need to be concerned over the corrosive effect of the flux on the inside of the shell.

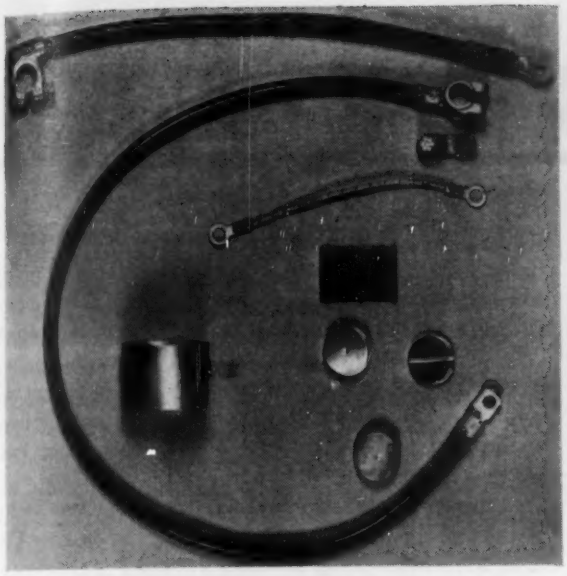
McCord's aluminum soldering process has been used to solder aluminum or brass terminals to



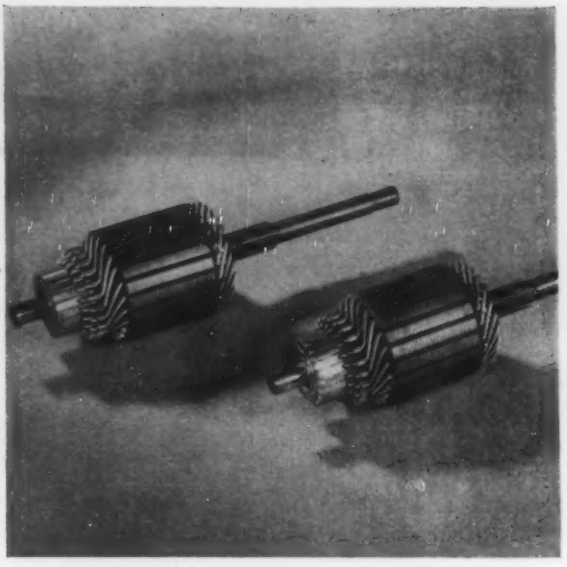
COPPER FINNED heat exchange core, soldered using the new type flux, after exposure to 72 hours humidity test.



COPPER FINNED heat exchange core soldered using zinc chloride flux after exposure to 72 hour humidity test.



TYPICAL PARTS soldered with Coronil fluxes: Aluminum battery and ignition cables, brass carburetor float, terminal board for electronic circuit, and soldered double-lock seam on aluminum cylinder.

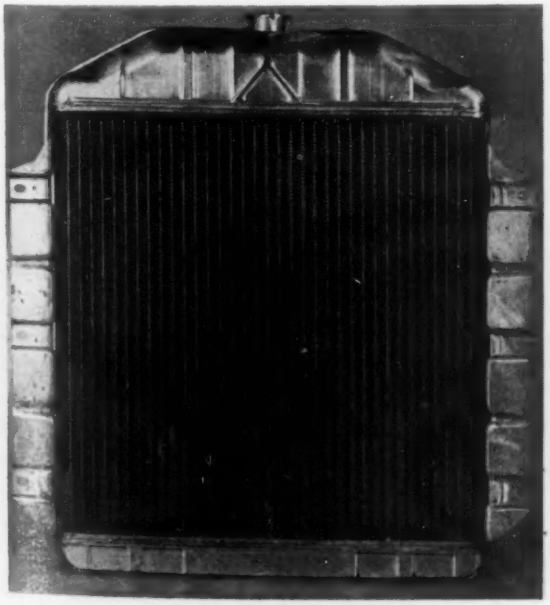


ARMATURE with aluminum windings and copper commutator sections before soldering, rear. In the foreground the assembly is shown after soldering but before the commutator is turned down to remove excess solder.

aluminum electrical conductors such as battery cables. Dozens of aluminum battery cables were installed on test cars for periods of several months.

In every case, except one, resistance of the cables to electric current had not changed significantly. In the one exception, resistance had increased 5 microhms over the original 180 microhms. This small percentage could very well be ignored when it is considered that an increase of as much as 100 pct could be tolerated with copper cables. As a result of this testing program, two automobile manufacturers have approved the use of aluminum ignition and battery cables soldered by this method.

McCord has recently worked with an automotive manufacturer in the application of the fluxes to several soldering problems. One aspect of this work is an armature with aluminum windings, soldered to copper commutator sections. Assembled into a starting motor, the unit has been satisfactorily undergoing tests for several months.



COMPOSITE RADIATOR with aluminum cooling fins soldered to brass tubes. Combination opens field for many new applications.

COPPER-FINNED radiator core assembly passing through Coronil flux curtain prior to soldering in a baking oven.

Wrap it up—

STRETCH WRAP FORMING

By L. F. Spencer
Chief Metallurgist
Landers, Frary & Clark
New Britain, Conn.

Part I

◆ The aircraft industry's need for a less costly method of forming large sheetmetal, extrusion, and brake or roll-formed sections, has led to wider acceptance of the stretch wrap forming method . . . Now other sections of the metalworking industry are adapting this unusual metal fabricating method.

◆ Secret of the method is the increase in yield strength attained by stretching and "setting" the metal beyond its original design yield strength . . . Advantages include reduction in labor costs, elimination of wrinkles, fewer operations, and less hand straightening.

◆ ADVANTAGES of stretch wrap forming—long recognized in the aircraft industries—are finding wider application in other branches of metalworking where large parts must be formed. Used extensively on aluminum base alloys, the stretch wrap forming method has been successfully applied to low-carbon steels, stainless steels, and some magnesium and copper base alloys. The method has been used successfully for forming structural members of escalator frames, bus bodies and special automotive coach work.

Here's how it works. The material to be formed is gripped on both ends and stretched over a predetermined form block until the elastic limit of the material is reached. Parts may be stretch wrap formed from sheet stock, rolled or brake formed sections, and extrusions.[1]

Elasticity has a strong influence on the success of the method. If you apply a load, Fig. 1, to a given material, *under* the elastic limit of the material, a deformation will result. Release the load and the material will normally return to its original size and shape.

This is the first of a two-part article. Part II will appear in a subsequent issue.

But, where loading exceeds the elastic limit, deformation will not be proportional to the applied load, and the section will have lost that ability to return to its original size or shape. Upon reapplying this tensional load, the metal will no longer elongate at the original yield point, but will resist until a load several percent higher is applied.

Proper stretching materially increases yield strength. In one example of this phenomenon[2] a 24S aluminum alloy showed a 20 pct increase in yield strength over design yield strength when stretched more than 6 pct. Moderately formed 75S aluminum alloys and severely formed annealed stainless steels had a value of yield and ultimate strength within 2 pct of design value.

Die stationary during forming

This fact is used to advantage in stretch wrap forming. A die with the desired contour is mounted and remains immovable during the forming operation. The material to be formed is held securely in mechanically or hydraulically operated jaws. The material is held at a tangent to the front of the die and stretched almost to its yield point.

As this tension is maintained, the material is wrapped around the die, accurately molding itself into and around each die configuration. At this stage, additional tensional force to slightly above the material's yield strength is applied. This sets the contour shape and increases yield strength. Uopn release, the part retains the shape of the die. Yield points of a few materials which are stretch wrap formed are given in Table I. When using this chart in determining machine capacity, the values should be increased approximately 25 pct.

Some scrap is produced

Hydraulically activated equipment offers excellent control during forming. Actuating arms are controlled by hydraulic cylinders. Travel of the arms is regulated by preset mechanical stops. Present equipment performs both the wrapping and stretching in producing the part of the required curvature.

Machines vary in capacity. Choice depends on the die mounting area required, width and thickness of sheet to be stretch wrapped, and the die length required for 180° bend.

A certain amount of scrap is encountered. The ends of the material—gripped in jaws serrated to provide a firm hold on the section to be formed

CUTS FABRICATING COSTS

—must be scrapped. In addition, where forms are to be produced from sheet stock, trim on both the top and bottom of the formed piece is required. On structurals, extrusions or other formed shapes, which are bent only, just the ends of the formed shape need be scrapped.

In forming light gage materials such as the aluminum alloys, springback is negligible and often no compensation for this factor is required. This is not the case in forming heavier gage materials or a high-strength alloy such as the stainless steels. Moreover, springback is increasingly important in present-day applications due to the closer tolerances. Thus, a die correction to obtain a formed part of the required dimensions is needed.

Allowance for springback cannot be calculated from die plans alone. A test part must be pulled on a die made to a template with the contour lines of the part. From the contour obtained on the test part, the die is reworked to compensate for the springback. This procedure of testing, in the determination of both springback and other variables within the process, is standard and precludes the use of adequate records so that the conditions of stretch forming for a specific part can be duplicated.

Other advantages of stretch wrap forming include reduction of labor costs, less breakage during forming, elimination of wrinkles, reduction of operations, less hand straightening.

Aluminum base alloys are widely used in

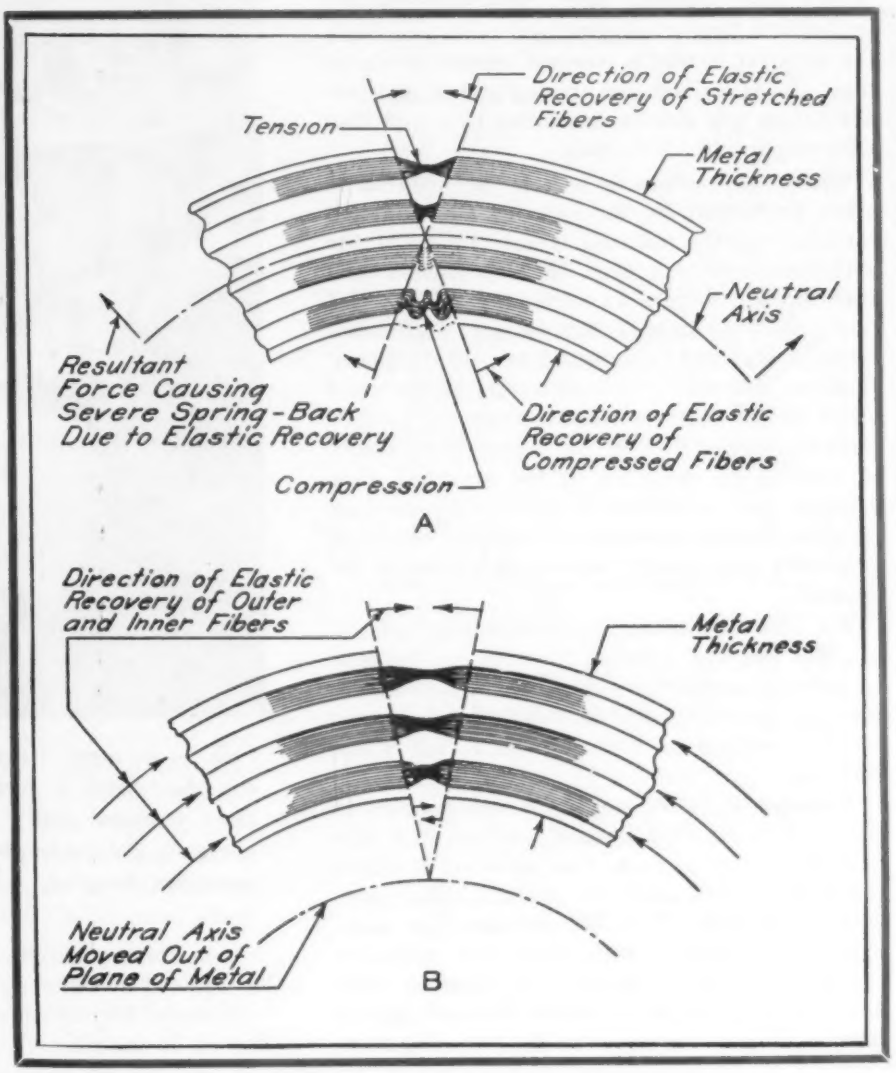

Direction of Elastic Recovery of Stretched Fibers
Tension
Metal Thickness
Neutral Axis
Resultant Force Causing Severe Spring-Back Due to Elastic Recovery
Direction of Elastic Recovery of Compressed Fibers
Compression
A
Direction of Elastic Recovery of Outer and Inner Fibers
Metal Thickness
Neutral Axis Moved Out of Plane of Metal
B

FIG. 1 — Here's what happens when you bend a piece of sheetmetal. Locked-in tension and compression forces cause springback as shown in A. Stretch forming eliminates springback by placing all the metal fibers in tension as shown in B of this Reynolds Metals Co. drawing.

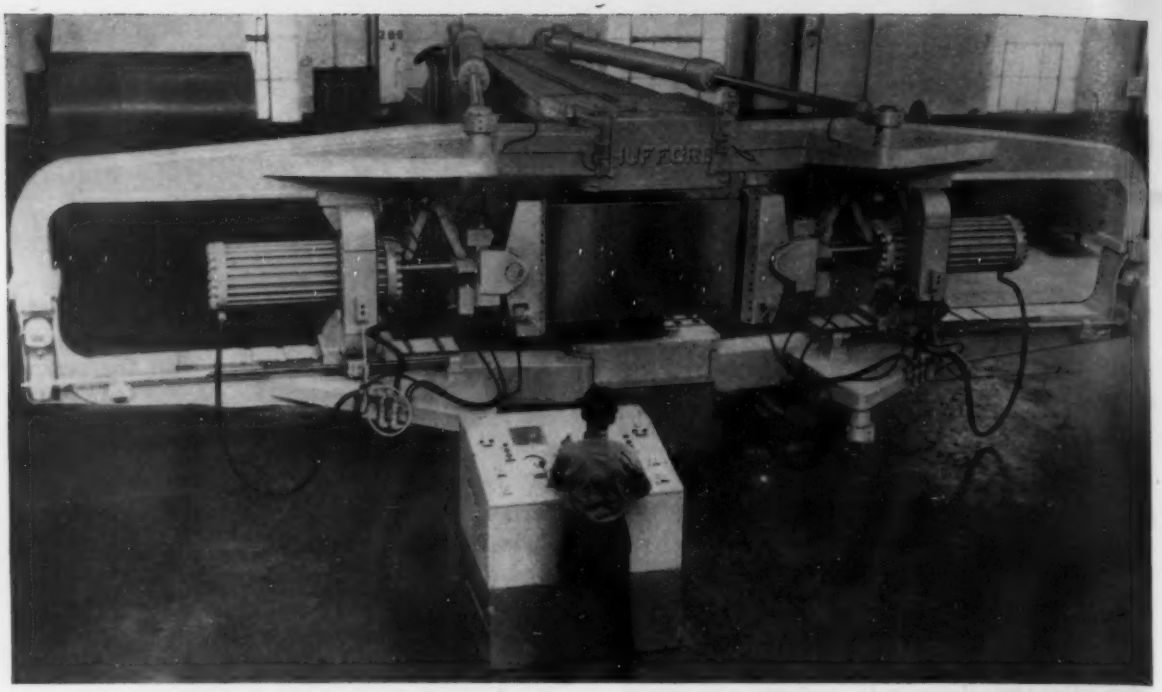


FIG. 2—Two engine cowlings (above) are formed simultaneously on this Model 50 Hufford stretch wrap forming machine. Here sheet is in position before forming starts.

stretch wrap forming. With these, stretchability varies with temper or structural condition. Since the material formed is stressed beyond its elastic limit, the range between an alloy's yield and tensile values will largely determine how well that alloy can be stretch formed.

Where the contour is severe, the material is often preformed in the S-O or fully annealed condition. If the material is heat treatable, the preformed part can then be heat treated, and then finished formed in either the S-W or S-T condition. This implies that maximum stretchability is obtained in annealed or S-O condition. However, material in the cold worked tempers and alloys in the heat treated condition can also be stretch wrapped formed. But since stretchability is reduced as compared to the annealed alloy extreme care is needed to successfully produce required shapes. Selection of material condition is usually dictated by the severity of form required.

The aluminum alloys most frequently used are 24s, 61s and 75s. Limited forming can be done on annealed magnesium sheet. But where severe forming operations are involved, the sheet may require heating to 500° to 600°F for warm forming.

Annealed stainless steels are well adapted to stretch forming. For limited contours it is also possible to stretch form this material in either the ¼ or ½ hard condition. Stretchability varies with composition. Type 301 stainless has maximum stretchability with type 302 following closely behind. Stretchability decreases in types 347 and 316 in the order named. Where a harder temper alloy, as compared to the annealed state,

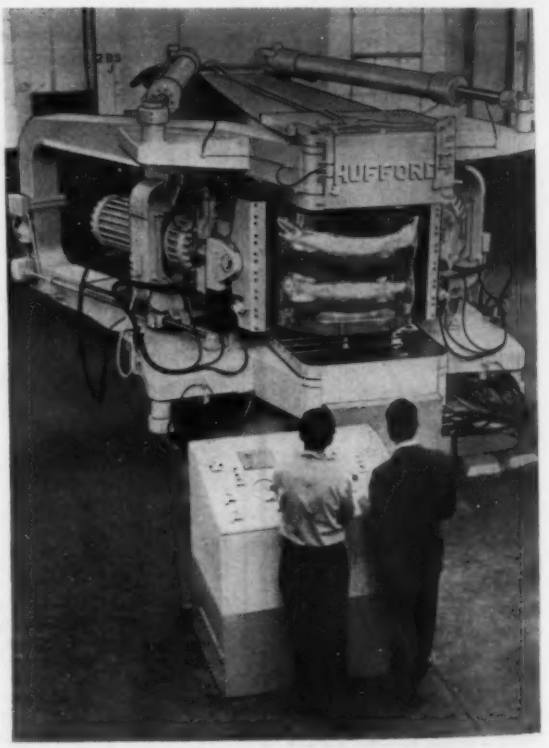


FIG. 3—As arms of stretch wrap machine close the sheetmetal is formed around die block. Extra tensional load "sets" material and improves its yield strength. Photos courtesy North American Aviation.

is to be formed, maximum formability can often be obtained by reducing the speed of stretching.

Annealed low-carbon steels can also be stretch-formed. In the forming of structural shapes used

in escalator frames, excellent uniform curvatures have been obtained from hot-rolled steel. If cold drawn material is used, inconsistencies in forming may result since the cold working in the material may not be uniform. This necessitates furnishing material of uniform hardness.

In forming sheet stock, use a rectangular blank of predetermined size. This blank size should be sufficient to form the part and also permit the trimming allowances required on all four sides of the sheet. Where possible, shear the blank so the direction of grain parallels the direction of stretch. This will permit maximum elongation in the stretch direction.

As a precaution against fracturing due to notch effect, and, to obtain maximum stretch, sheared edges of the sheet be rounded by sanding or filing. In forming difficult shapes, it may be necessary to polish the edges in the free area of the sheet between the die and jaws. Both precautions should be followed to obtain most favorable strain distribution within the sheet during forming.

Although other factors influence strain distribution, where all factors are under control, reproducible results are possible. Due to the severity of forming, materials with imperfections will not stretch form successfully since fracture will occur before forming is complete.

Cutouts made after forming

Holes or cutouts in the finished part are made after forming. The blank must be of uniform width and strength to avoid rupturing at the cross-sectional area of least strength. In stretch forming stainless steels, the only exception to constant width of blank is parts with tabs along the concave edge of a flange.[4] With this condition, not more than two tabs should be present under the following conditions:

Length of tabs should not exceed 4 in.; width of the tab, including flange, should not be more than 40 pct greater than the regular flange width; curvature radius of the part at the location of the tab must be in excess of 30 in.

Permissible stretch varies with the material and the condition of the sheet. A maximum elongation of 13 pct in 1 in. has been found for the aluminum alloys.[2] For annealed stainless steel maximum elongation is 32 pct in 1 in. Tentative stretch values for steels, see Table II, are given by Krivobok and Sachs.[4]

Reduction in gage thickness[2] is usually negligible and, in most cases, material thickness after forming is well within the original sheet tolerances. Test data have been obtained from specimens formed of 24S 75S stock immediately after heeat treat and quench, on 24S-T3 and 75S-T6, and on austenitic stainless steel sheets in both the annealed and ½ hard temper.

Reduction of thickness was determined by cutting the formed part into strips 5 in. wide. Thickness measurements were made on the edges of these strips. Greatest reduction in thickness was 0.003 in., within normal sheet tolerances except where the original sheet thickness is on the low side of the tolerance. Aluminum alloy formed in the asquenched condition had a lower percentage of reduction in thickness than formed in the hardened S-T conditions.

Fig. 2 shows how the material is gripped in straight one-piece jaws during the stretch wrapping operation. The operator controls the operation from a central panel. Fig. 3 shows the finished form. Relative movement of the outer members containing the pressure cylinders and jaws is illustrated.

Fig. 4 shows steps in progressive forming of a radar dome on a Model 50 stretch wrap forming machine made by Hufford Machine Works, Inc., El Segundo, Calif. The material is annealed stainless steel. The Hydra-Curve jaws are made of separate jaw segments hinged together by segmental pivot pins permitting a flexible action. This design has several advantages, including less end scrap.

Less tension is required to form parts and

TABLE I

COMMONLY USED MATERIALS*

Yield Points

Material Type and Condition	Yield Point (psi)
Steel	
1015, hot-rolled	45,500
1015, cold-rolled	62,000
1018, hot-rolled	48,000
1018, cold-rolled	70,000
1020, hot-rolled	43,000
1020, cold-rolled	66,000
Stainless Steel (ASTM A177-44)	
Annealed	30,000
¼ hard	75,000
½ hard	110,000
¾ hard	135,000
Full hard	140,000
Aluminum	
24S-O	11,000
24S-T3	50,000
24S-T4	48,000
24S-T36	57,000
24S-O Alclad	11,000
24S-T3 Alclad	44,000
24S-T4 Alclad	42,000
24S-T36 Alclad	53,000
24S-T81 Alclad	60,000
24S-T86 Alclad	66,000
75S-O	15,000
75S-T6	72,000
75S-O Alclad	14,000
75S-T6 Alclad	67,000

* Manufacturer's guaranteed minimum values. To determine machine capacity, increase by approximately 25 pct.

TABLE II

STAINLESS STEELS

Tentative Stretch Values

Type	Condition	Elongation, Pct in 1 in.
301, 302, 304, 305, 316, 321, 347	Annealed	20 to 30 (On symmetrical and rigid sections)
301, 302	¼ Hard	15 to 20
301, 302	½ Hard	5 to 10
301	Full Hard	To 2 pct

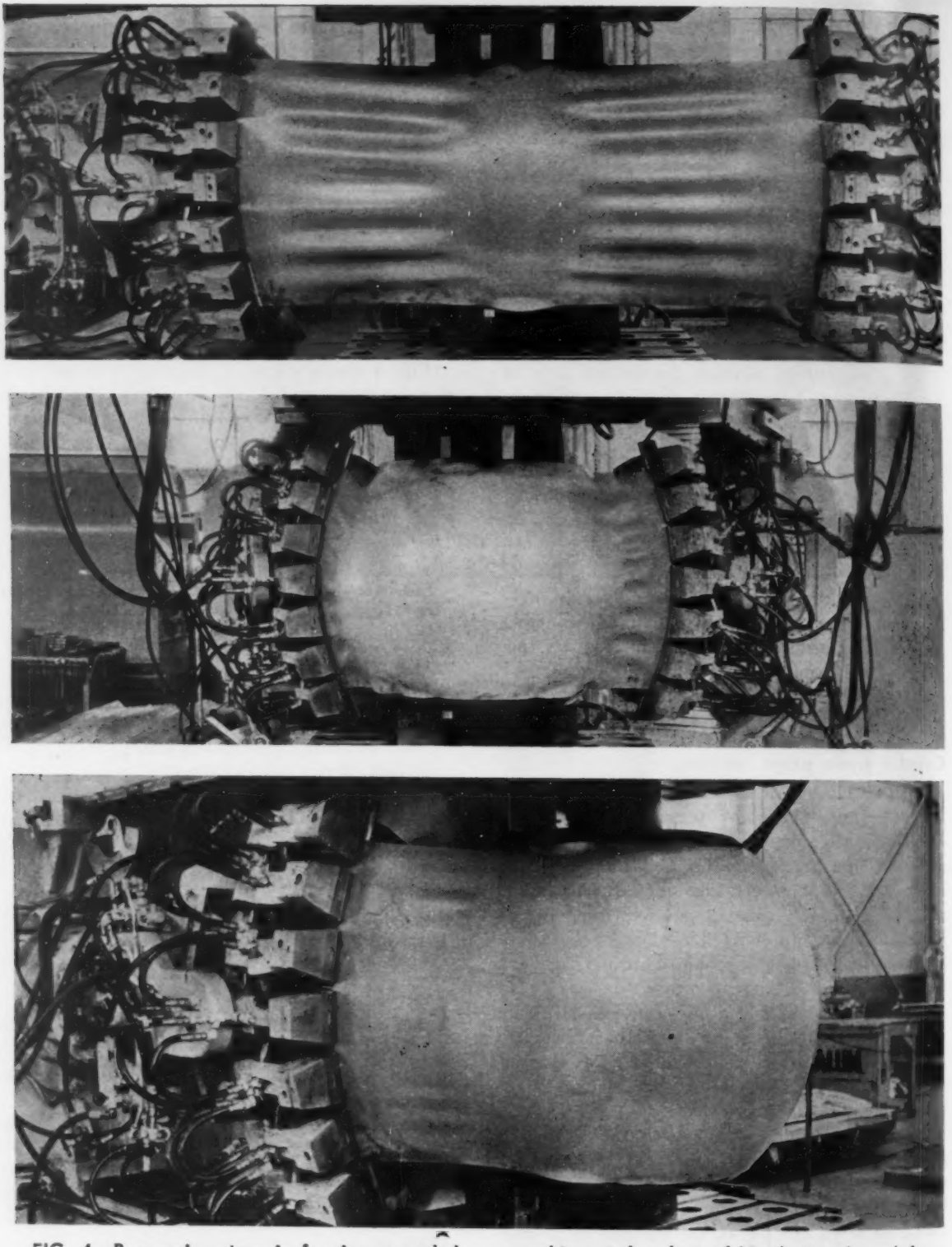


FIG. 4—Progressive steps in forming annealed stainless steel radar dome on a Hufford Model machine at the plant of North American Aviation, Inc., Los Angeles.

fewer strains develop. Strains that do develop during forming have a more uniform distribution. Sheet material of considerably less surface area can be used. This savings in material may be as high as 30 pct. Elimination of high localized stresses has reduced wrinkling of parts and tearing of the sheet. With the Hydra-Curve jaws many aluminum in alloys in the S-T condition can be formed.

Procedures in the forming of any specific shape must be developed on an individual basis. Once the conditions of forming are determined and the values of variables determined—for tensional pull in initial and final stretching, adjustment of springback, type and method of application of lubricant, dimensional values of sheet, extrusion or brake-formed section—results can be duplicated.

AUTOMATIC LATHES, Special Fixtures Speed Turning Operations

By Herbert Chase
Consultant
Forest Hills, N. Y.

- New production setup permits turning of three axle shaft forgings at a time in automatic lathes . . . Turning is completed in one fast cycle . . . Work is rotated at two different speeds.
- High precision is obtained with less labor and fewer machines . . . Subsequent grinding operations are reduced . . . Special fixture reduces work handling in and out of the machine.

♦ AXLE SHAFT FORGINGS are machined faster and with greater precision at the Buick Motor Div., General Motors Corp., Flint, Michigan plant through the recent installation of eight, 3-spindle automatic lathes. One operator running two machines completes the turning and facing operations on 75 flanged shafts per hr. Previous setups for machining these shafts required three, single-spindle lathes (two for roughing and one for finishing) and three operators, to turn out 30 forgings per hr.

Greater production per square foot of floor space is not the only advantage gained in the use of these machines. Ability to hold closer limits cuts in half the amount of metal removal formerly required in subsequent grinding of the oil seal diameter. This results in shorter grinding time as well as a big reduction in wheel wear.

The axle shaft forging, Fig. 1, is produced from SAE 1330 steel and heat treated from 400 to 420 RC on the flange and 310 to 330 RC on the shaft before machining. Aside from the toughness of the material, machining these shafts presents a problem because the flange at one end has a 6.5-in. diam after machining while the splined shaft is only 1 7/16 in. in diam. There is a marked difference in cutting speed if the same rotary speed is held.

Added to these difficulties is the fact that the heavy cuts required generate considerable heat resulting in high temperatures for the tools, the machine and the work itself. Heating makes the parts harder to handle and produces uncomfortable working conditions. While the use of a coolant helps reduce the heat and prolong tool life the shafts still become rather hot.

To help overcome this, handling in and out of the machines is greatly facilitated by the use of a special fixture, see Fig. 2. This fixture is double-pivoted so that it is easily swung toward and away from the machine and can also be turned about a vertical axis through the center of the three horizontal supporting arms. Each of the supporting arms carries a pair of supporting jaws at each side.

The operator loads the fixture with three forgings while it is swung away from the machine and three previous forgings are being machined inside a sliding guard that keeps the coolant and the hot chips confined. When the turning cycle is completed and the spindles stop, the operator slides the guard back and swings the fixture inward until its three pairs of empty jaws engage and pick up the shafts.

Fixture swings 180°

When the machined shafts are supported, the centers that held them during the machining cycle are retracted, freeing the three shafts from the machine. The operator then swings the fixture outward enough to clear the machine and turns it 180°. This brings the new set of shafts toward the machine and the fixture is swung inward to bring the three shafts in line with the three sets of centers. These are then advanced and support the three new shafts in position.

Having reloaded the machine in a quick and easy operation, the operator swings the fixture

MR. CHASE, engineer, former trade magazine editor and author of engineering texts is noted for his articles on the latest industrial developments.

outward, closes the guard and presses the button to start the automatic cycle of the machine. As this cycle proceeds, the operator applies gages taken from a box at the bottom of the fixture to check all dimensions of the parts just machined. Then he unloads the finished shafts and puts a new set of three in place, ready for the next cycle. One operator can run two machines.

Since the fixture always holds each of the shafts it carries at the proper center height, no difficulty is encountered in bringing the shafts into line with machine centers. It is not necessary for the operator to hold each shaft while he finds and locates it on the centers, because the fixture does this and permits shafts to be brought quickly and easily into correct loading position.

Although supported on centers, each forging is driven by a sleeve whose end engages a forged recess in the outer face of the flange. This sleeve surrounds the center at the flange end and is subjected to heavy torsion during heavy cuts. Initially, these sleeves often broke and were expensive to replace. Breakage has now been virtually eliminated by introducing a self-aligning cross key that, in effect, constitutes an Oldham coupling. This compensates for any lack of alignment between the drive spindle and the recess in which the outer end of the sleeve bears.

Eleven tool bits are at each of the three stations of the machine. Only one tool cuts on each shaft at any given time except two which chamfer and cut a groove in the small end simultaneously. With the exception of one tool which makes two passes on the back face, all tools complete their cuts in a single pass. The lathes are completely carbide-tooled.

Most of the tools have square or diamond shape sections and are ground square at both ends so that they provide eight cutting points. Tool holders set to give a 7° negative end rake angle and a 7° side rake angle. Settings are precisely on center or slightly below. A narrow negative rake land is ground on the end of the carbide tip of the grooving tool and it is given clearance at each side.

The larger part of the machining is done at the flange end. Tools for this end are supported on a single slide that is moved horizontally for turning cuts and vertically for facing cuts. These motions are all automatic and follow the same sequence. Tools at the small end of the shafts are on a second slide.

Soluble oil coolant used

Turning operations on the shaft proper are performed with the shaft driven at 750 rpm. During the operations in which the flange is faced, turned and chamfered, the rotary speed is automatically dropped to 375 rpm. This permits all tools to operate at an efficient cutting speed. Speed changes are made by the shifting of a clutch which drives through different gearing in each position. Each machine is driven by a fixed speed 60-hp ac motor that is loaded close to capacity during the heavier cuts.

Coolant of the soluble oil type is used largely to lower temperatures. Although the tools will operate dry, the higher temperature attained may affect the machine and become uncomfortable for the operator.

For the first cut which turns the step diameter on each shaft, a tool of circular section is used. It is allowed to drag during its return motion as this helps to hold the 1.874 to 1.879-in. diam. Only the oil seal diameter has to be ground to the hold 1.5320 to 1.5325-in. diam. On the spline outside diameter, limits are held within 0.002 in. Big end diameter is checked every second cycle and the groove diameter on alternate cycles.

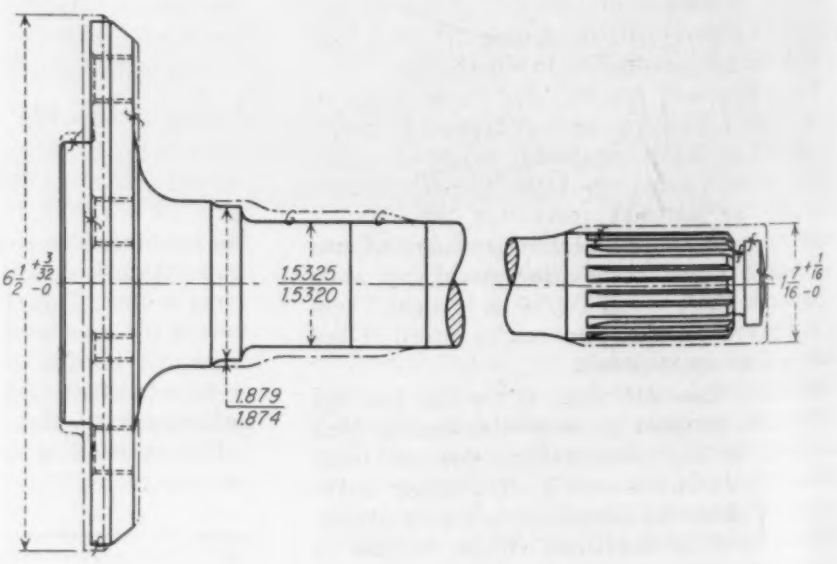


FIG. 1—Facing, turning and chamfering operations on this rear axle shaft are performed on Man-Au-Trol lathes at the rate of 75 shafts per hr using two machines.

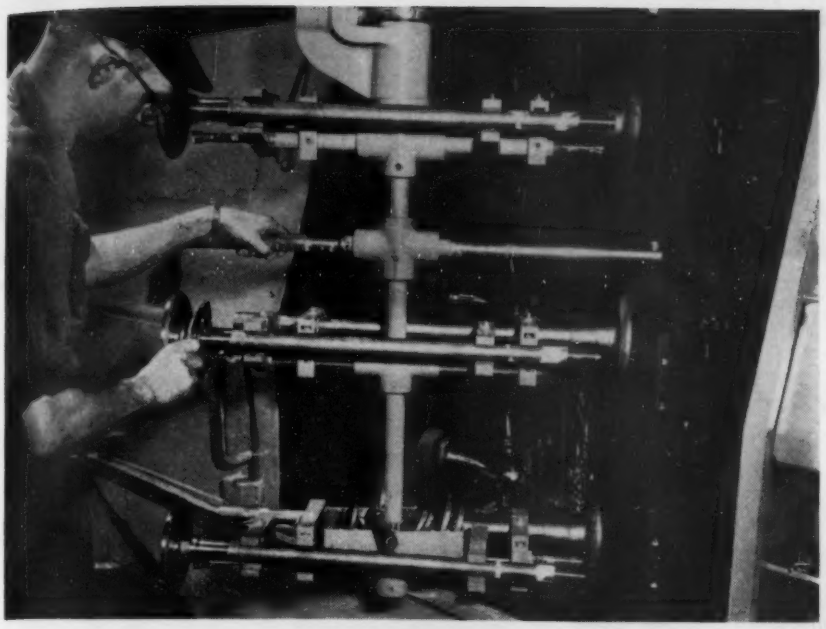


FIG. 2 — Fixture holds three shafts, shown being gaged after machining, and three forgings, about to be loaded in the three-spindle lathe in background.

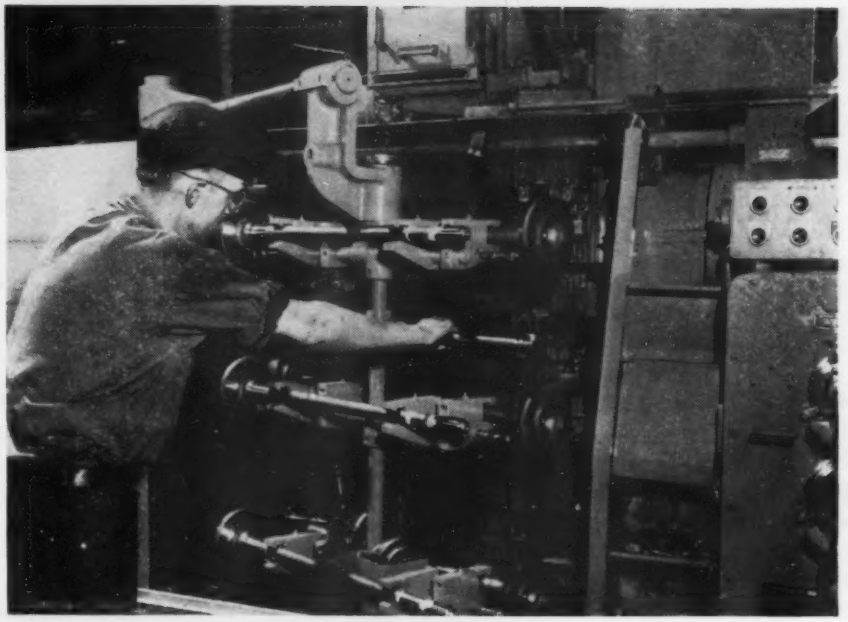


FIG. 3—Operator swings double-pivoted fixture into position where forgings are in line with automatic lathe centers which advance and hold forgings for turning.

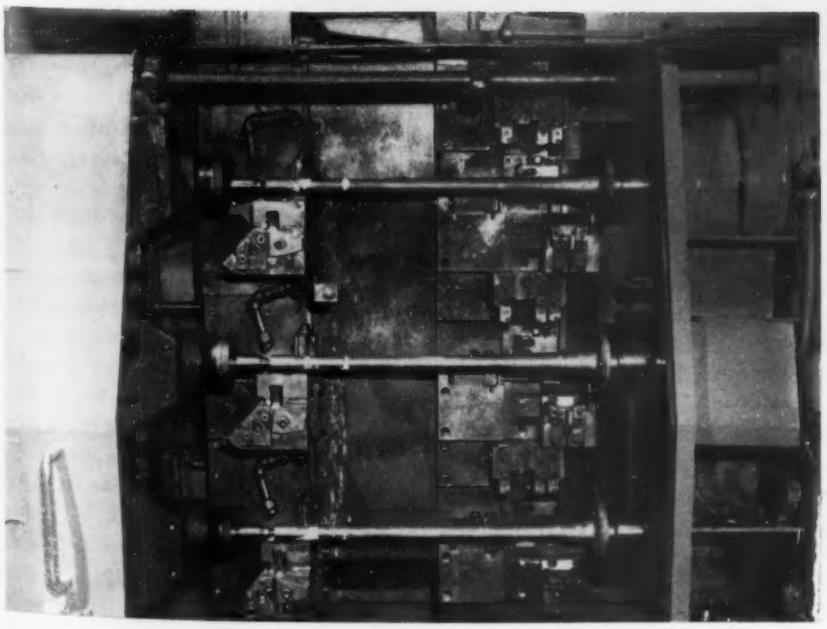


FIG. 4—Three axle forgings ready for machining in the lathe. Eleven tools in holders shown here make all cuts on each shaft in a completely automatic cycle.

Investment v. shell mold—

PART NEEDS D

By Davidlee Von Ludwig
Consultant
Brooklyn, N. Y.

◆ Precision, smoothness and uniformity in the three basic investment techniques depend on pattern material . . . Surfaces of sand shell mold castings are nearly as good as those of as-cast investment castings.

◆ Average investment cast production is for less than 10,000 units though 100,000 runs are common . . . Production runs on the sand shell mold process are usually for 1000 units or more . . . Cost-wise, sand shell molding is definitely competitive for parts weighing 1 lb or more.

◆ RAPID DEVELOPMENT of investment casting methods and the sand shell mold process have complicated the task of specifying a casting process for a particular application. Most often asked is which method is best for cost, quality, precision and ease of reproduction. Answers lie in design, tolerances, volume, size, thickness, uniformity and the metal or alloy to be cast.

The three basic investment casting processes differ primarily in types of pattern materials used. In practice, differences in mechanical, thermal and chemical properties of the various wax, plastic and metal pattern compounds affect cost and accuracy of the casting more than the differences in investment mold materials.

Disposable pattern materials determine the degrees of precision, surface smoothness and reproducible uniformity. They largely establish the composition of investment used. This is particularly so with the frozen mercury metal pattern which requires special refractory slips to form ceramic shellmolds.

Wax and plastic patterns differ significantly in use from the frozen mercury process. The ceramic shell mold has marked metallurgical advantages combined with potential economic advantages. Major investment foundries are spending large portions of their research budgets to find an equivalent thin shell mold for use with either wax or plastic patterns. Properly made wax patterns, invested without mishandling, produce parts to as close tolerances as present metallurgical and casting conditions permit.

The ceramic shell mold produced by the frozen mercury process offers flexibility. The mold is made by repeatedly dipping the frozen mercury patterns and their gates, runners, risers and sprues into several slurries of differing consistencies. The first slurry is usually a very thin slip which coats the frozen mercury.

After each dipcoat, the cluster is dried. By using volatile, low-temperature fluids such as Freon in the vehicle for the refractory oxides of zirconium, titanium and similar stable materials, drying time is short between dips.

At least three different slurries are usually applied, depending on the nature of the mold. The number of dippings depends on the thickness of ceramic shell required. The average is from 8 to 10 and sometimes as many as 20 dippings are used. The coating is built up with progressively heavier slurries, the last usually including coarse quartz or silica sand for greater shell permeability.

MR. Von LUDWIG, author of a major reference book on this subject, specializes in investment casting. His work was first published in THE IRON AGE in 1948.

OS Determine Best Casting Method

PITTING in martensitic stainless is a surface oxidation reaction between metal, air and investment. Nozzle casting for milk bottling machine illustrates this type flaw. These two photos courtesy of Arwood Precision Casting Co.

LOW-CARBON STEEL investment castings are quite rough as they come from the mold. These rotary looper castings for industrial sewing machines are in the as-cast condition and cut from the sprues. Foundry finishing is necessary.

Formation of a ceramic shell on mercury corresponds to dipcoating in applying a fine-grained, smooth coating to wax or plastic patterns when forming molds for steel or other high-temperature alloy castings. However, the slurry which coats the wax or plastic patterns is usually a silica flour base containing small amounts of iron, chromium, zirconium, titanium, aluminum and other oxides for improved chemical stability.

The vehicle is usually water, alcohol and percentages of various acids plus a binder of ethyl or silicate. The dipcoat applied to wax or plastic patterns has very little thermal or mechanical strength in contrast with the ceramic shell in the mercury process. It must be supported with backup investments similar in chemical and thermal properties. This minimizes spalling and cracking of the coating during pattern extraction and mold firing.

The dipcoat is generally applied to wax or plastic by a single immersion in a comparatively viscous slurry. Two dippings are sometimes used, one a light slurry and one a heavy slurry. Difference in cost between the one or two dippings for wax or plastic patterns and the 10 to 20 required to make the ceramic mold is quite large.

Mercury patterns are melted directly from their ceramic coat either by pouring room temperature mercury over the sprue end of the cluster or by allowing the coated cluster to warm to room temperature, or both. The green ceramic shell is rotated and shaken lightly to remove all droplets of mercury. It is then placed into a curing and firing furnace for 2 hr to be vitrified.

Completed shells are strong, resembling unglazed porcelainware in appearance. These hard, light shells may be stored indefinitely and are totally stable dimensionally and chemically. Preheating the cold shell is necessary only to drive off occluded water and to bring the mold and flask to proper temperature for metal to flow into all design details. Flasks usually contain

More than 95 pct of the parts cast in sand shells weigh more than an ounce . . . Most advantage is for parts from 1 to 20 lb.

the shell in a backup of coarse sand to allow maximum egress for gases or air during casting.

Dipcoated wax or plastic patterns must be backed with a relatively dense investment mixture, which, when fired, becomes brick hard in many instances. Pattern extraction and firing of these solid investment masses is tedious and costly, requiring from 8 to 24 hr depending on mold size, complexity and size of patterns invested and thermal properties of investments.

Costs prohibit universal application of the ceramic shell mold. Capital needed to set up a plant for frozen mercury patterns is considerably higher than for wax patterns. Loss of mercury in processing is slight, averaging 2 pct per year. However, even a small plant requires a very substantial volume of mercury.

Cost of mercury patterns is also high because of the slow production cycle to form each pattern. Cost of refrigerating large chests and vats for form −80° to −130°F is substantial.

No inexpensive die technique comparable to the soft metal die to form wax or plastic patterns exists for mercury pattern forming. Mercury amalgamates with most metals and can be handled only in steel dies. Nonmetallic materials have been investigated as possible soft die materials but generally failed to retain physical and mechanical properties at extreme operating temperatures.

Steel pattern dies used in conjunction with mercury must be made with extreme care to compensate for thermal variations, shrinkages, etc., which takes place at −100°F. In spite of high unit cost for mercury patterns, the ceramic shell process permits filling sections substantially thinner than in alternate investment molds. It extends sizes which may be cast economically.

Growth in the investment casting trade has been toward larger quantities and sizes. While more than 95 pct of investment cast parts weigh an ounce or less, more design and materials problems such as those embodied in the Wright Turbo diaphragm nozzle casting are being solved by production investment casting.

"C" mold process less flexible

Experimental rough castings made by the mercury process have weighed over 90 lb and were 30 in. long or more. One of the largest production parts to date is still the diaphragm casting which weighs 17 lb and has a maximum diameter just under 14 in.

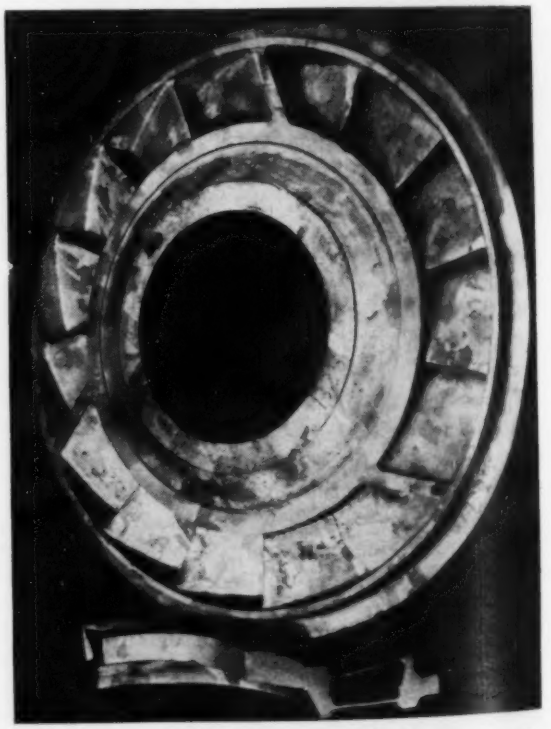
In terms of quantity, production runs of 100,000 units and more are common for investment cast parts. Most production runs are under 10,000 pieces with a great percentage still considered production runs with 1000 units or less.

The "C" mold process is somewhat less flexible than investment casting. In terms of size and minimum economically justified volume, the sand shell mold has limited applicability. More than 95 pct of parts cast in sand shells weigh more than an ounce. Its advantage is most pronounced for parts weighing from 1 lb to about 10 or 20 lb depending on the specific mass of the metal being founded.

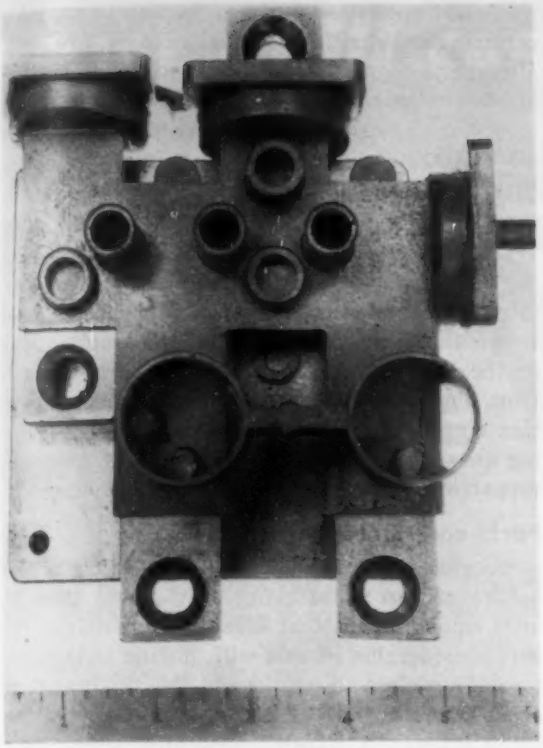
Minimum production volumes for the sand shell process are gauged from 5000 to 10,000 units. But a volume of 1000 units can be cast economically if the part has extensive area, thin section, intricate detail, and if the as-cast finish saves much machining.

The comparatively high cost of precision match-plate metal patterns for sand shell molding plus extensive preparation and experimental time in getting into production limits the minimum economic run of parts. Similarly, the ceramic shell process is seldom used for less than 1000 to 5000 units due to high tooling costs and long development time.

Tolerances in investment cast parts can generally be held to ±0.003 in. per inch of dimension for low-temperature, nonferrous alloy castings and ±0.005 in. per inch of dimension for steel and high-temperature or refractory alloys. Most investment cast parts have maximum dimensions under 6 in. with more than 50 pct of



TYPE 310 STAINLESS nozzle diaphragm is one of the largest investment castings made on a production basis. Hot acid etch reveals grain structure. Photo by Midwest Foundry Co.



HOLDING TOLERANCE in investment patterns for radar castings requires use of precision cores and precision ground chilling plates. Tolerances are held to 0.002 in. overall for flatness. Photo by Arwood Precision Casting Co.

production parts with maximum dimensions under 1½ in. in any direction.

Maximum section thickness is proportional to the overall size of the piece, but sections thicker than 0.250 in. are seldom welcomed by investment foundries. Sections thinner than 0.050 in. in steel and high-temperature metals or 0.030 in. in aluminum, magnesium or copper-base alloys are not desired for production control. The ceramic shell process can cast steel, Stellite and similar refractory alloys as thin as 0.012 in. for limited areas.

Basically, the sand shell mold process is limited to casting single parting design which may be molded with comparatively simple cope and drag match-plate patterns.

Sand shell molds made from very fine sand flours and a resin, oil or plastic binder, will produce castings in which surface defects are minimized. The as-cast surfaces of many alloys will be nearly as smooth as those of as-cast investment castings. Finishing in the foundry can produce matte surfaces in which pits and surpluses are controlled or absent.

A good sand shell pattern can be held to tolerances of about 0.010 in. per inch of casting or less. Also, by proper reworking of the pattern and control of the shell predrying cycle, temperature of the pattern and other factors, tolerances can be held as close as those promised by most investment foundries.

With some exceptions, the "C" mold process is competitive to investment casting for parts weighing 1 lb or more.

The wax pattern process holds the edge in capital costs and in rapidity of reaching production for intricate parts in small volume. The plastic pattern process, by using Kirksite or other zinc-base metal die inserts is seriously threatening the supremacy of wax patterns for short order runs. Until a soft die is developed for freezing mercury, the mercury pattern will be used chiefly for ceramic shells.

Use of permanent, precision patterns in the "C" mold process presents an economic obstacle to the growth of investment processes in mass production industries. The fixed unit cost of producing and investing disposable patterns is high and does not diminish much by volume.

Cheaper to alter pattern

From 20 to 50 hand operations are required in producing a finished investment product. Most of these operations are in making the disposable pattern, in preparing the patterns for investing, and in separating and finishing the cast pieces from the invested cluster. By using permanent metal patterns, the "C" mold process eliminates most of these operations.

Many operations on the disposable pattern eliminate machining in the final part. It is much cheaper to alter the disposable pattern than to finish stainless steel or Stellite. At present, manual handling is the only way to secure intricate detail in all planes. The single parting metal pattern in the "C" process cannot duplicate most investment designs. Even when the multiple parting principle is applied commercially, cumulative errors of the several parting planes limit the process.

Difficult to compare costs

Few production items cast in sand shell molds are suited for investment casting. This is because most commercial production has been to simplify bulk casting of items in machinable metals. Very little work has been done with gray or malleable iron in investment. While much investment casting is done with brass, parts are usually small, intricate and cast only to avoid costly machining operations.

Cost determination on a per pound basis has never been practiced in investment foundries. Products made by most "C" mold foundries are sold on a per piece basis as are investment foundry products. It is difficult to evaluate competitive positions between process where one technique produces a brass plumbing fixture weighing 8 oz for slightly more than $1 while the other process produces a brass instrument part weighing 1/10 oz for the same price.

Investment castings rarely cost less than 50¢ each. More than half of all products made cost more than $1 apiece. Very large volumes of

Ceramic shell mold gains are offset by high tooling and mercury pattern costs.

small, simple pieces have been cast for less than 25¢ each and a few have cost as little as 10¢. Such investment castings are rare.

An investment casting of almost any common metal weighing 8 oz seldom sells for less than $2 if tolerances are close. On the other hand, heavy parts in everyday production by shell molding may also sell for less than $2, exclusive of finishing costs. Good results with simple parting molds for parts cast of machinable metals and more than 8 oz give sand shell molding an economic advantage over any investment process.

Advantages of the ceramic shell mold are offset by high tooling and mercury pattern costs. Development of compound patterns of wax and plastic to eliminate thermal stress factors is overcoming the advantage formerly held by frozen mercury for large disposable patterns.

The metallurgical advantages of shell molds is a major reason why the investment trade is striving to extend the use of the ceramic shell to the wax-plastic divisions. When backup is used for ceramic sand shells, it is usually coarse, dry sand. However, other materials have been used. Backup of iron or copper shot has been used to chill cast structures. Ceramic shells may be quenched in air blasts, or by immersion in oil or water to secure metallurgical properties unobtainable in other investment cast products.

DIP-COATING frozen mercury patterns is done in two different slurries to form ceramic shell mold. Chest and slurries are then refrigerated to —100°F or lower. Photo by Alloy Precision Casting Co.

Little has been done in this direction with the "C" mold process because it is possible to cast into unbacked shells. However, experiments have shown that quench casting of hard bronze alloys in the bell metal can increase tensile strength from about 30,000 psi to 100,000 psi and elongation from 2 to 15 pct. An automatic cycle casting quenching machine can improve the physical properties of many alloys cast in sand shell molds.

Parts cool fast in shell mold

Roughness of casting may often be due to the nature of the metal being cast rather than to mold smoothness. Most investment foundries report considerable trouble with pitting in the surface of stainless alloys 410 and 416. Plain carbon steels such as SAE 1010 and 1020 are noted for being inherently rough. Austenitic steels, such as types 321 and 347, sometimes give pitting troubles with thin sections.

The ceramic shell process generally gives less trouble with pitting than other investment techniques. This is due to higher chemical stability of refractory oxides used in the shell. Also, cast parts cool and solidify much more rapidly in the shell mold than in solid investment molds.

No single technique desired

Wax patterns predominate in the investment foundry. Plastic patterns are considered for production of 1000 or more pieces but wax patterns usually hold an edge until production reaches more than 10,000 pieces. Use of mercury patterns is confined mostly to special design problems where results with wax or plastic patterns are not good enough. Frozen mercury will self-weld on contact to another piece of frozen mercury. Very intricate cores may be incorporated on the booking die insert plates to form details impossible with draw or insert cores used with wax patterns.

No single pattern technique is universally desired. The "C" mold process holds an edge over investment casting where larger volume and larger casting size are involved for relatively simple parts. Even the perfection of ceramic shells used in conjunction with wax or plastic patterns is unlikely to change this condition.

Present investment foundry production exceeds $200 million per year. Its growth is clearly toward detailed designs too difficut to machine.

The sand shell mold process will take over a larger part of the ordinary foundry production by improving design and reducing finishing cost.

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To insure long, dependable service from Philadelphia Worm Reducers, the greatest care and research goes into the selection of materials for the worms and worm gears. The predominant sliding action dictates the use of dissimilar metals to minimize frictional wear.

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Worm Gears are of high quality chill cast nickel bronze to provide greatest strength, with a low coefficient of friction against the worm.

These and other features of Philadelphia Worm Gear Reducers are explained in detail in our Catalog WG 51 . . . send for a copy.

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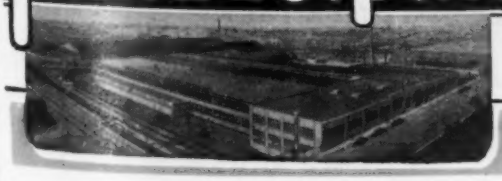

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Technical Briefs

HEAT TREATING:

Furnace line heat treats 50,000 fasteners an hour

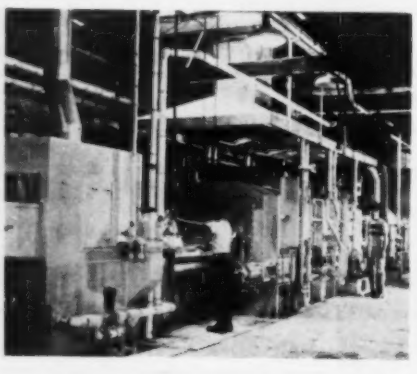
An automatic production line is now heat treating up to 50,000 screws an hour in the hardening room of Standard Pressed Steel Co.

All operations, weighing, 1st wash, hardening, quench, 2nd wash, tempering and rustproofing are timed and tied together by a series of powered belts and shaker conveyors so that handling is completely automatic. Built around a 30-ft long radiant tube hardening furnace and a special gas-cracking unit that provides a precisely-controlled inert atmosphere for the heat-treating process, the entire line cost SPS close to $200 thousand.

Mainly for Large Runs

The equipment will maintain an estimated production rate of 1000-1400 lb of screws per hr depending on the size of the fastener being processed. Designed and installed by Surface Combustion Corp. primarily for large scale runs on standard items, the new line can economically process large or small batches of any type threaded fastener, switch from one product to another and back with minimum lost production time.

In addition to increased output, another big bonus of this mechanized heat treater is precision in handling and in heat-treating. Engineers of SPS and Surface Combustion carefully planned the flow of product and the sequence of conveyors, shakers and gravity drops to prevent nicking of threads and marring of surface finishes.



NEW AUTOMATIC 110-ft furnace line, capable of heat treating 50,000 screws an hour.

Heat Treating Precision

Precision in heat-treating is promoted by the auxiliary gas-cracking unit that supplies an inert atmosphere to the hardening furnace. SPS pumps propane gas into its new gas-cracker, gets out an inert gas of precisely-controlled temperature and composition. This constant atmosphere permits SPS to control with pinpoint accuracy the hardness of its fasteners and the quality of the finish.

Set Carbon Recovery

The gas-cracker thus prevents scale formation and decarburization. Through a few simple adjustments, the cracker can be set to supply the exact amount of carbon recovery desired. Actually, with the gas-cracker, the hardening furnace can be operated as a carburizer — adding controlled amounts of carbon to the case of the screw to build up a hard shell around a relatively mild steel.

In the hardening furnace radiant-tube type the screws are brought into perfect solution at a temperature of about 1600° F. The controlled atmosphere that fills the furnace excludes oxygen, other reactive elements, and prevents decarburization and scaling. The hardening furnace uses the bulk of the 2700 cu ft of gas consumed hourly by the entire line.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 87. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

MACHINING:

Fixtures speed brake shoe broaching

To reduce loading and unloading time to a minimum and speed up the broaching operation on automotive brake shoes, pneumatic positioning and hydraulic clamping have been combined on the shuttle fixtures of a broaching machine. The machine is a standard dual ram 10-ton 54-in. stroke, with specially designed shuttle fixtures, made by Colonial Broach Co. Insert type broaches cut a slot at one end and a concave at the other at a rate of 400 brake shoes per hour.

Accurate Positioning

Single manual control of three pneumatic cylinders enables the brake shoe to be positioned accurately against three stops with a flick of the control lever. Release of the part is just as fast, after broaching.

Hydraulic clamping, with a single cylinder actuating a saddle clamp, is an integral part of the automatic broaching cycle. Since there are two shuttle fixtures, one can be loaded and unloaded while the other is going through the broaching cycle. Stock removal on both the ½-in. slot and the 13/32-in. concave is 13/32 in. maximum. Thickness is 13/32 in. at the concave and 3/16 in. at the slot.

TESTING:

Refrigeration unit uses eight tons CO_2 per day

Eight tons of carbon dioxide "dry ice" a day is used by AiResearch Mfg. Co. to test the performance of its airplane accessories in below-freezing conditions met at high altitude. Fifty-pound chunks of dry ice are melted at the rate of a ton an hour in the company's large block ice refrigeration system.

The system consists of a tank in which methanol is sprayed over dry ice to cool at a temperature of −110°F. Finned coils containing

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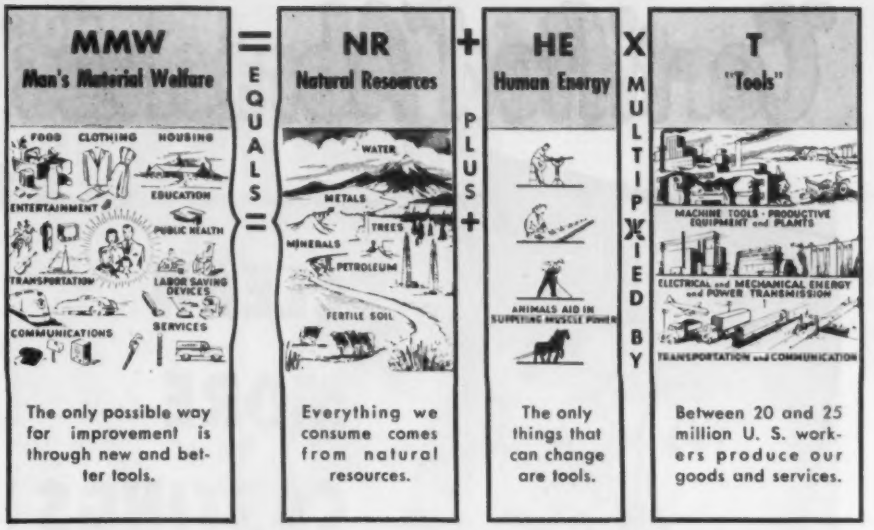
(*Advertisement*)



What Is Economic "Good"?

The social consciousness of the worker, politician, businessman, labor leader, clergyman, teacher and private citizen has probably never been more aroused than in recent years. All seek "the greatest good for the greatest number", yet often fail to agree on the definition of, and means for accomplishing, the goal.

One of the most clarifying approaches has resulted from adding the letter "s" to the word "good". Food, shelter and comfort consist of, or result from, goods. Thus, "the greatest goods for the greatest number" gives society a clear noncontroversial definition of what it is seeking, at least materialistically. More importantly, it reveals the way to achieve the goal.

Man's material welfare (the goods and services available to him) is the result of his productivity. Productivity is based on three factors: 1) natural resources, whose form, place and condition are changed by expenditure of 2) human energy (both muscular and mental) with the aid of 3) tools.

Man can't appreciably affect the quantity and quality of his material resources or his own energy. But, he can do a lot about the quantity and quality of his tools. Thus, he has the opportunity to acquire almost unlimited productivity and goods.

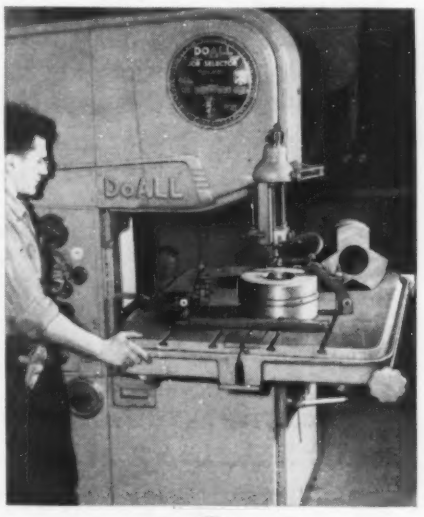
Tools come into being in a free society only when there is reward for the temporary self denial that people must practice in order to channel part of their earnings away from purchases that produce immediate comfort and pleasure, and into new tools of production.

Obviously then, laws and rules designed to help achieve economic justice for all will defeat their own purpose if they discourage saving and investment in tools.

•

Among the most dramatic machine tools contributing to man's material welfare are the contour sawing machines developed by The DoALL Company. These machines, using an endless saw band or other band tool, are used to cut all metals, asbestos, rock, glass, rubber, paper, stone, wood, cloth, plastics, in fact any material, to any shape. They are used in more different plants and industries than any other type of machine tool. The DoALL Company, Des Plaines, Illinois, through any of its 38 DoALL Stores will demonstrate these machines in any plant free of charge.

MAKING ROUNDS square—a job best done by the DoALL band machine.



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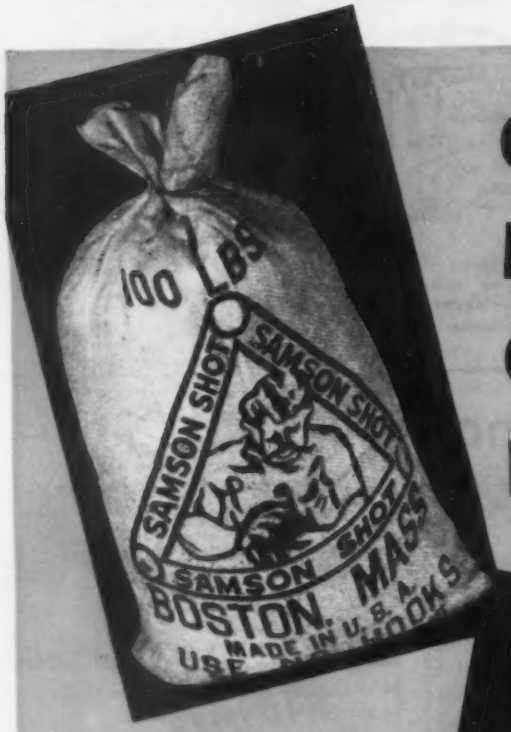

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SPEED UP production in *your* blast cleaning room with "Certified" Abrasives. "Certified" Samson Shot and Angular Grit are first choice in hundreds of foundries...give better, longer performance because they're made *extra-tough* by a special *automatically controlled* hardening process. Specify "Certified" and start cleaning more castings per day.

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FEMA

—Technical Briefs—

Stoddard solvent are immersed in the alcohol. The coils then deliver the refrigerant to cold chambers in the heat transfer and high-altitude labs. The huge system turns out 14,500 Btu per minute.

Oil Thick As Tar

In the heat transfer lab, the biggest user of the refrigerating capacity, a 150-hp Cadillac engine blows air over the tubes containing the cold solvent. The chilled air is blown into a chamber in which oil coolers for aircraft are tested in temperatures as low as −75°F.

The test is to make sure the oil will not stop its flow to the engines under any operating conditions. If the oil cooler and its temperature regulating system are operating, the oil will bypass the cooler to maintain a predetermined engine oil temperature.

Oil is also left stationary two hours in the cooler at −4°F. The oil cooler must operate within a few minutes after the engines are started.

AiResearch also has a freon refrigeration system, which can deliver a temperature as low as −40°F. It is used for precooling the chamber or for use in tests in which a higher temperature can be used.

WIRE ROPE:

New reel cuts wire rope costs and installation time.

A cable reel for dozer use, designed to eliminate wastage of large quantities of wire rope due to the wearing out of small sections, is announced by LeTourneau-Westinghouse Co.

Called the Tournarope bantam reel, its installation on a tractor is simple. This 14-in. reel, which holds 150 feet of ½-in. Tournarope, is designed as a storage reel and equipped with a bracket that can be welded or bolted on a tractor. The Tournarope is threaded through the dead-end unit, through the sheaves and to the power control unit.

When a section of rope shows wear it is cut off, and an amount of Tournarope equal to the section

Turn to Page 138

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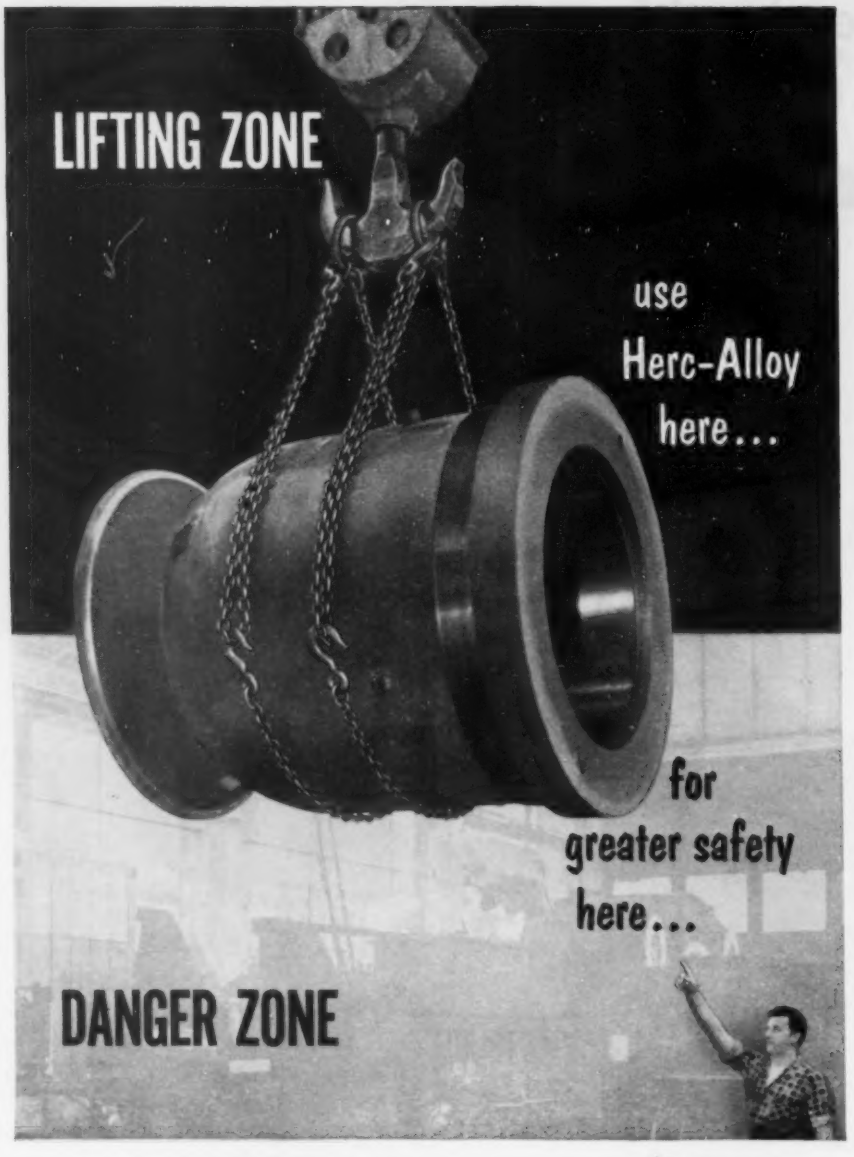

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HERC-ALLOY Sling Chains are made-up to order, are individually tested, registered and guaranteed.

Hundreds of plants like the one shown above* are using Herc-Alloy Sling Chains. Greater safety is their big reason for doing it. But there are other factors too. Herc-Alloy is economical because of its long service life. Then too, the use of alloy steel permits a weight reduction that helps prevent worker fatigue. These advantages are worth thinking about. Those who do consider them seriously generally adopt safe Herc-Alloy Sling Chains for their plants.

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cut off is pulled from the storage reel, and reattached to the power control unit.

Saves 50 Ft Each Time

Before the new method was employed an operator used approximately 65 ft of wire rope to thread his blade. Installation time was costly. When the cable broke, there was usually a 50-ft section showing no wear, but unusable because of its short length.

With the Tournarope Bantam reel method a storage reel holds enough rope for many days of operation. Only a short time is needed to pull through and cut off the worn section of the cable. As many as six cuts can be made, saving fifty feet each time under the new method.

STEEL HANDLING:

Diesel-electric switcher cuts production delays.

Replacing its old steam locomotives with diesel-electric units saves considerably in costs at Sharon Steel Corp. Eight locomotives, Baldwin - Westinghouse switchers, transport hot metal from blast furnace to open hearths, haul and dump slag, spot coke and ore cars, and many other switching operations.

Delay Means Loss

Availability is important because even slight delay may mean a heavy loss in production where time is critical. The new locomotives go at the push of a button and incur no extra costs for hostling, fire cleaning, coal loading or steam charging, as with a steam locomotive. The

DIESEL-ELECTRIC SWITCHER positions "thimbles" at blast furnace, then hauls slag to dump where thimbles are tipped electrically.

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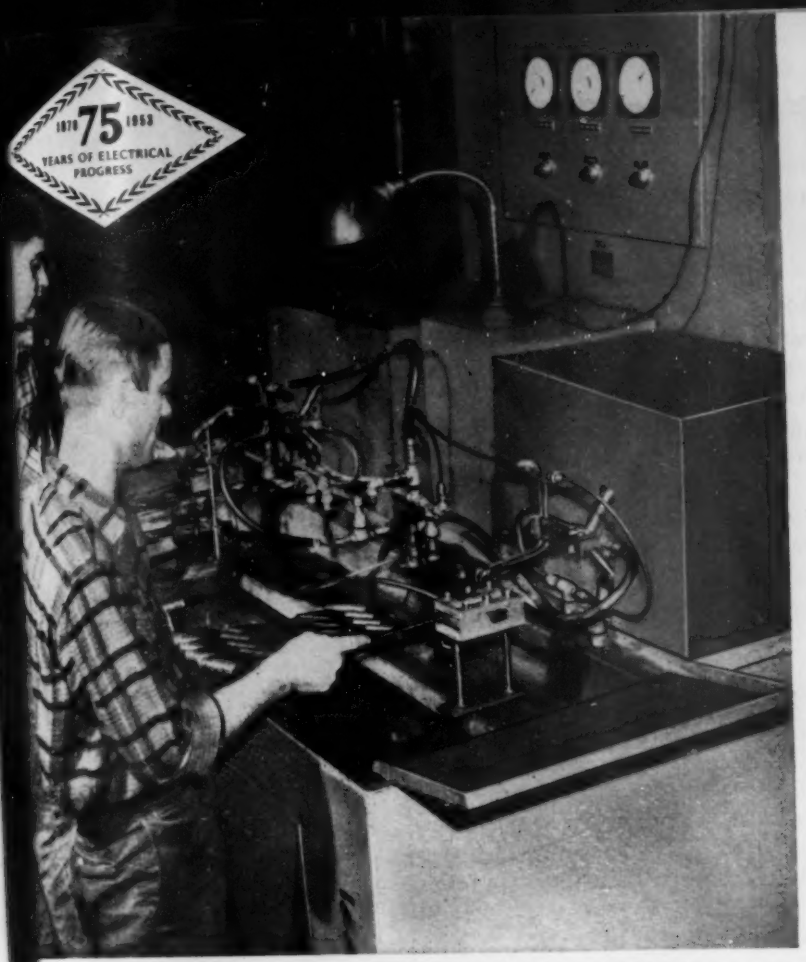


INDUCTION HARDENING RACK BARS AT BURROUGHS CORPORATION.

ardening Costs Cut 65 Percent With G-E Induction Heaters

changing to induction heat, we reduced rack-bar hardening as much as 65%," reports ley Bankett, Jr., heat-treating man at the Plymouth Plant of Burroughs Corp., Detroit, Mich.

hen using old heat-treating meth- for hardening parts, Burroughs faced with expensive straighten- perations to eliminate distortion. , by applying selective induction with G-E heaters, Burroughs -treats only the areas that re- hardening—thus preserving the nal shape of the bar while taining top quality.

proved working conditions are her benefit now enjoyed by oughs, because compact G-E heaters eliminate the discomfort of radiant heat and provide cleaner, more comfortable working areas.

Burroughs has added six G-E heaters since first adopting induction heat. Today, they use induction heat for a variety of heat-treating operations involving many business-machine parts. In each case, substantial savings have resulted.

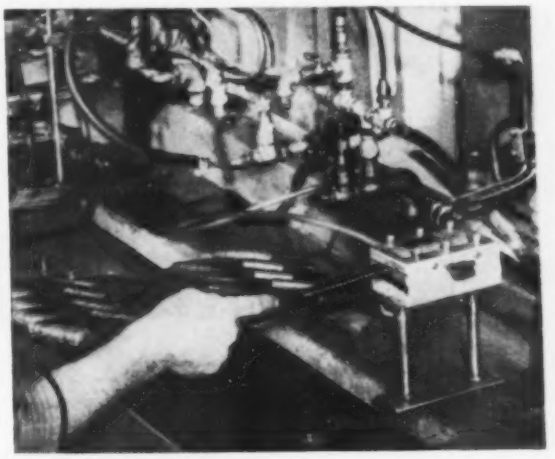
This high-quality selective heating at lower cost is available to you. To learn how you can profitably apply G-E induction heat to your operations, contact your G-E Apparatus Sales representative. And write now for bulletins on G-E induction heaters to General Electric Co., Sect. 720-108, Schenectady 5, N. Y.

You can put your confidence in—

GENERAL ELECTRIC

SELECTIVE HARDENING occurs at darkened areas which must resist excessive wear. Maximum hardness is obtained without distorting bar.

ACCURATE HEAT CONTROL in the simple induction fixtures shown above and below assures uniform hardness of every bar.



HIGH-SPEED PRODUCTION is typical of G-E induction heating. Over 1500 parts are heat-treated daily in this versatile G-E 15-kw unit.

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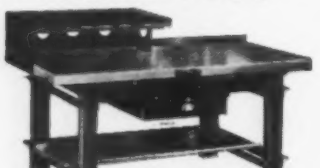

Four sizes. Cast iron top, two inches thick. Welded steel supports, tool box shelf, steel drawer with lock.

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diesel-electrics need refueling and resanding only every three days.

Eliminate Smoke

Fuel weight is on the locomotive where it increases traction. They can haul 50 pct greater loads, especially up the steep grades. Another feature is their ability to furnish quickly the large volume of compressed air to dump cars.

Aside from lower operating costs, the diesel-electrics eliminate the smoke nuisance when they enter buildings and aid the air purification program.

Designed for Safety

Each locomotive is equipped with dual controls for operation from either side of the cab. This allows better visibility since it permits the engineer to operate from the side having more serious operating hazards. Cabs are heated and contain all necessary safety and signal equipment needed to operate safely in highly congested areas.

CORROSION:

Plastic protects jet blade tote baskets

Tote baskets to carry jet engine compressor blades used at Utica Drop Forge & Tool Co. are being plastic-coated with a new vinyl plastisol made from B. F. Goodrich Chemical Company's Geon paste resin.

To withstand the extremely corrosive effects of trichlorethylene de-greasing baths used in the

TOTE BASKETS used to carry jet blades through corrosive trichlorethylene de-greasing bath are protected by vinyl plastisol.

Turn to Page 144

Kaiser Aluminum

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It also means that your overhead costs on space for storage are greatly reduced. And you can offer better service to your customers because you have, immediately available, widely diversified stocks of aluminum to choose from.

Take advantage of the *many* services offered by your Kaiser Aluminum Distributor to help you increase your production, cut your costs, raise your profits. Regardless of the size of your order, he'll give personal, experienced attention to your aluminum problems. Let him go to work for you *today.*

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Your Kaiser Aluminum Distributor is listed at the left; See him—**soon!**

Get all these benefits now from your Kaiser Aluminum Distributor!

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3. BY PURCHASING AS YOUR NEEDS ARISE you need less space to house your raw materials. You can devote more space to profitable production.
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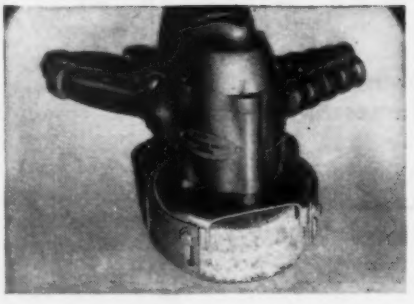
Dismantling an air tool for regular inspection and maintenance is one way to insure better air tool performance.

Unfortunately, it's also one way to wear out or strip threads in tool housings—and that means re-tapping the holes and using oversize screws, which adds to tool maintenance time and costs.

Fortunately, this can't happen to you—if you're using Buckeye tools—because every threaded hole in Buckeye tool housings has a *replaceable* Heli-Coil insert. That means you always drive screws into a hardened steel thread—so you can't wear or strip threads in the housing—ever.



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Portable Air and Electric Tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

blade manufacturing operation, a new vinyl plastisol was formulated by The Stanley Chemical Co. It also provides tough, durable coating for the tote baskets which are used as protective racks and carriers throughout each stage of jet blade manufacture.

It was necessary to find a coating for the baskets because the zinc covering came off easily in the trichlorethylene washing bath, dulling the steel alloy jet blades.

Hard Plastic Surface

Difficulty was encountered in coating the baskets with an ordinary plastisol coating because in test runs the trichlorethylene would seep underneath the covering and break through the plastic.

After considerable experimenting a special plastisol which resists not only trichlorethylene but also perchlorethylene, was developed. The surface of the plastic is hard enough and slick to facilitate rapid drain off and minimize carry-over. A prime is used under this plastisol to obtain maximum adhesion.

NONDESTRUCTIVE TESTS:

Conductivity meter speeds test on nonferrous materials.

Rapid measurement of conductivity by a new instrument gives it much use for laboratory control or factory testing. The Magnatest F-100 meter, developed by Magnaflux Corp., Chicago, eliminates the need for wire-like samples or cross-sectioning of parts.

The instrument gives absolute measurements of nonferrous conducting materials directly on a large scale. An operator merely places a simple hand probe on a part and reads the dial. All that is required is a flat area about ⅜ in. in diameter on which to place the probe.

Has Many Uses

For many applications, the absolute conductivity reading is all that is necessary. In some cases,

Turn to Page 146

In Full, Quality Production . . .

ALAN WOOD'S 30" STRIP MILL

The Alan Wood 30" continuous strip mill is turning out plates, sheets and strip at the maximum possible speed consistent with top quality standards.

In an effort to serve you even better, we are constantly working to step up this production rate—to improve performance, shorten delivery cycles without sacrifice of quality.

Our mine-to-mill-to-market control program assures you of finest quality in all of our products, of which sheets, plates and strip are but a few. And we assume undivided responsibility to maintain these high standards despite accelerated production.

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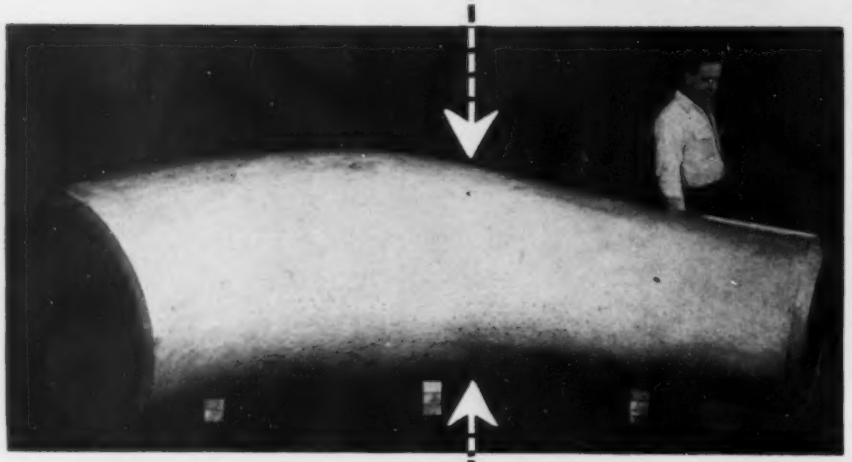
DURALOY

This Casting



Set a Record!

Casting weight
21,000 pounds

Shipping weight
14,000 pounds

Alloying Elements
38% Ni., 18% Cr., 2% Mo.

It's the weight rather than the Ni-Cr content that's the record.

We've cast many a piece with such a high Ni-Cr combination. But this represents the largest casting we have ever made. And it took careful scheduling of our entire battery of electric furnaces, with a double melt from two smaller furnaces.

Next followed a thorough X-ray for hidden flaws with our 400,000 volt unit. Then rough-finishing to specifications.

The significant fact is that this casting, the first of this size we have ever produced and destined for a most important high priority processing job, passed inspection with flying colors. *There was no reject here.* It is indicative of the skill of our metallurgists and foundrymen in turning out high alloy castings.

If you are looking for this kind of service, make Duraloy your casting source.

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—Technical Briefs—

these readings can be used to sort mixed lots of metals and alloys.

Another general category of applications depends on the relationship between conductivity and other physical properties. Conductivity of aged aluminum alloys, for example, varies with temper. Therefore, once standard comparisons are made in the laboratory, the destructive indent hardness test can usually be replaced by the nondestructive test.

Calibration

Calibration can be in any desired absolute units used in the various industries. For measuring small differences in conductivity, an instrument with a narrow range spread over the entire dial can be provided. Another is designed especially for stainless steel.

After calibration, the small hand-held detector is placed against the surface of the object to be measured. When the dial is turned to zero-set the meter, conductivity is read on the large dial scale.

Depth of Penetration

Measurements are independent of material thickness provided the material is thicker than the depth of penetration of the eddy currents induced by the probe. Depth of penetration is 0.040 in. for materials having about 90 pct conductivity and 0.080 in. for materials having about 12 pct conductivity.

SIMPLE PROBE makes conductivity testing easy and fast. Readings are made on large dial meter.

Turn to Page 148

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Saves time and trouble palletizing automobile bumpers

BUMPER-TO-BUMPER. Each multi-bumper unit is securely bound with Acme Steel Strapping, all ready to be moved by fork lift truck.

Shipping hundreds of awkward-to-pack, hard-to-handle automobile bumpers to auto assembly plants presents no problem to United States Spring & Bumper Co., Los Angeles. They quickly fasten each pallet-load of bumpers together securely with Acme Steel Strapping, making large easily-handled units.

This makes individual wrapping and loading unnecessary. And it takes only a matter of minutes to strap these bumpers onto pallets. Acme Steel Strapping saves time, money and weight, protects each pallet-load from damage and insures S. A. (Safe Arrival).

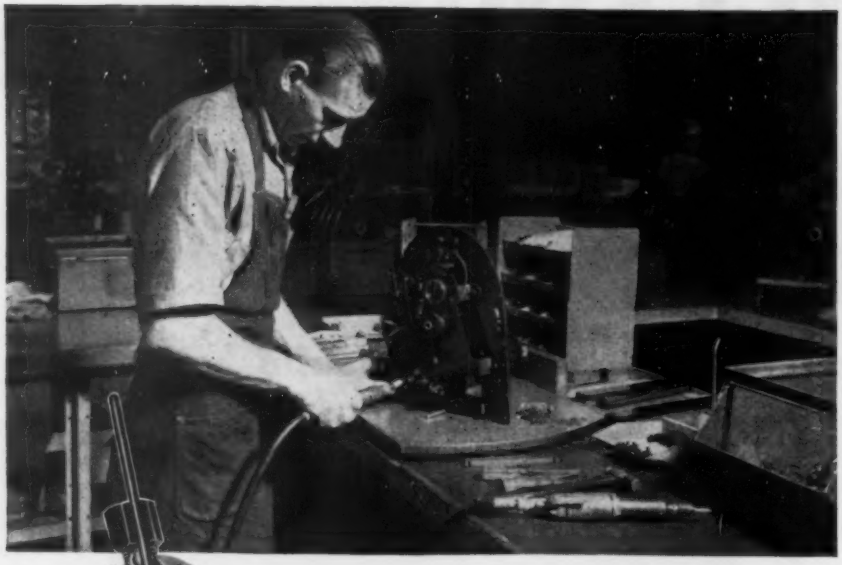
Whatever packaging problems you may have in your plant, chances are that Acme Steel Strapping or Acme Steel Stitching can solve them. Ask your Acme Steel representative. Or write to Acme Steel Products Division, Dept. IA-93, Acme Steel Company, 2840 Archer Ave., Chicago 8, Illinois.

STRAP IT . . . STITCH IT . . . SHIP IT . . . SAFELY!

ACME STEEL

KELLER Air Tools

Increase Production per Man-Hour



ANOTHER EXAMPLE OF

KELLER *Air Tools engineered to industry*

Keller Screw Drivers and Nut Setters brought important benefits to a manufacturer of duplicating machines. He says: "Since we started using Keller air tools there has been a noticeable reduction in worker fatigue, and increased production per man-hour.

"Our work requires highly skilled, intelligent workers, and these tools have given them better satisfaction in their jobs, and improved our labor relations."

Weigh less

Consume less air

Reduce operator fatigue

Wide variety of handles, gearings, torques, speeds

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—Technical Briefs—

MATERIALS HANDLING:

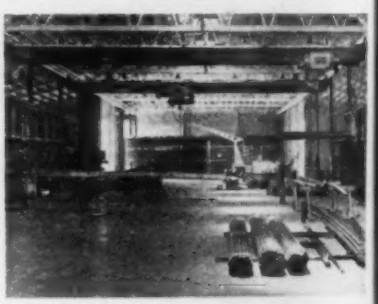
Unusual installation gives crane greater flexibility.

Hoists on two 3-ton capacity overhead cranes, having a span of 47 feet, were installed special swivel bases to give them greater flexibility. The swivel action permits the hoists to be turned in any direction on a 280° radius.

An important advantage of the swivel base, designed by the CraneVeyor Corp., Los Angeles, is that it permits the load to be pulled with the grooving of the hoist drum at all times. A locking mechanism is installed so that the hoist may be secured in several positions for each lifting operation.

This installation is ideal for unloading box cars and for handling materials such as light tubing and bar stock stored in racks.

This unusual application results in faster loading and unloading operations. It is the first such installation by this company.



FLEXIBILITY is the big feature of these warehouse cranes. They have specially designed swivel bases for hoists which speed loading and unloading.

PIPE:

Precast concrete used for industrial tunnel.

Use of Universal precast flat base concrete pipe for industrial tunnels is shown at the National Distillers Products Corp. plant in Cincinnati.

The company wanted a waterproof tunnel to house underground roller conveyor lines and to serve as a pedestrian pass between two plant buildings. Sections of precast 97 in. x 97 in. tongue-and-groove pipe were used with time and money savings.

FORMING:

Fixture lowers wrinkles in pressed aluminum parts.

A new wrinkle in hydropress operation at TEMCO Aircraft Corp. virtually eliminates wrinkles in pressed aluminum parts.

Officials estimate an inexpensive fixture, called an over-press cover plate, nets the firm a $5,816 annual saving by making hand-finishing an unnecessary aftermath to hydropressing. The method merely substitutes a second trip under the hydropress for lengthy hand-forming with mallets.

Flat work is still placed on dies and hydropressed once in normal fashion. It comes out of this operation shaped generally to fit the die, but not always to inspection standards. The reason is that hydropressure is not delivered directly to die sides. As a result, wrinkles from top pressure form on part sides, and side joggles come out imperfect.

Formerly Hand-Smoothed

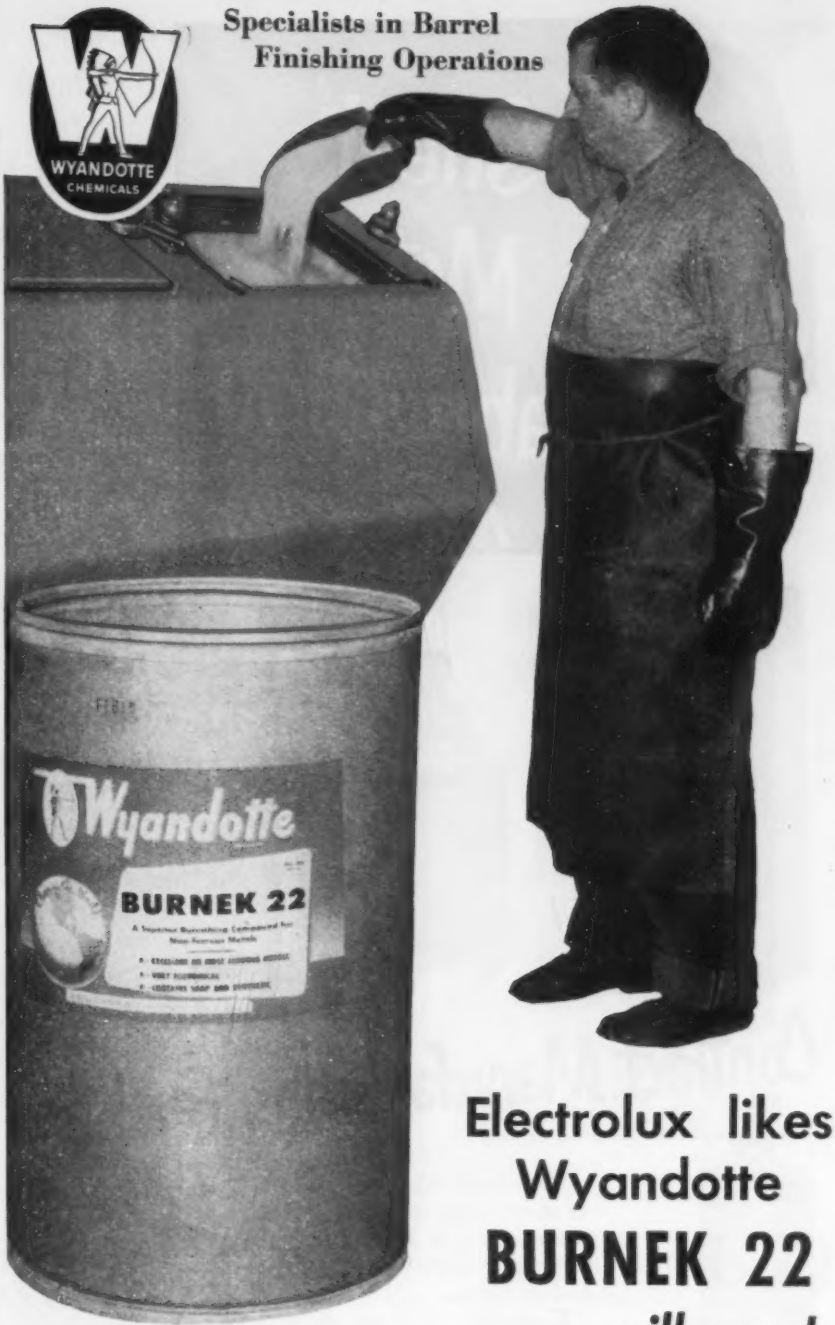
These wrinkles formerly were smoothed by hand. Now the over-press plate performs the same job when it accompanies the part and die on a second quick trip under the hydropress.

The plate consists of a flat piece of 0.125 in. aluminum, shaped to conform to the die top. This plate lies on top of the part, between it and the rubber face of the hydropress. Two steel rims, or flanges,

Turn Page

Gentlemen, it's going to open your eyes to see what Engineering has on the drawing board.

Specialists in Barrel Finishing Operations



BURNEK 22 being used at Electrolux plant in Old Greenwich, Conn.

Electrolux likes Wyandotte BURNEK 22 —so will you!

Mr. Milton E. Hodges, plant engineer, Electrolux Corporation, manufacturers of vacuum cleaners, says: "We have found Wyandotte BURNEK 22 to be very satisfactory; in fact, superior to other products previously used in our barrel finishing department."

Electrolux is another of many famous companies that use Wyandotte industrial products for specialized jobs. No matter what *your* metal cleaning or processing problems, you will find a specialized Wyandotte quality product to speed production, cut costs. Call in your Wyandotte metal cleaning expert today. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Angeles 12, California.*

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Write for NEW BULLETIN

This 40 page comprehensive booklet shows typical examples of Kirk & Blum fabrication, complete facilities of plant and equipment for jobs ranging from one unit to thousands.

KIRK AND BLUM
METAL FABRICATION

are hinged to the top plate by means of metal attach strips which are riveted to rims and top plate. These rims hug the sides of the die and the part it is forming.

Rims Flare Out

Rim and top plate are joined to form a right angle. But the flexible attach strips allow rims to flare out to an obtuse angle in order for the entire over-press plate-top and rims to be placed over the part and its die after the first hydropressing. Pressed again, a standard pressure is brought to bear on the part's sides by means of the rigid steel rims.

Rims prevent buckling and equalize pressure. They, in effect, are a forming die on the outside of the part which gives hydropress force more specific direction. To date TEMCO has made over-press plates for about 175 dies, at a total cost of approximately $400.00.

TITANIUM:

New method permits casting titanium shapes.

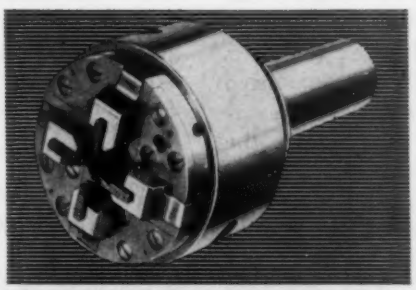
A method for the production of cast shapes of titanium metal has been developed by the National Research Corp. This is the result of an intensive program aimed at the development of special vacuum melting furnaces, casting procedures and mold materials capable of withstanding attack by molten titanium.

Now Made in Pilot Lots

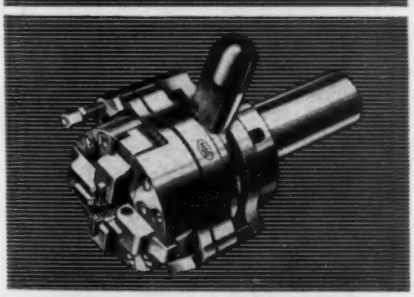
It is now possible to produce pilot quantities of cast shapes of both pure and alloyed titanium. Castings of complex shape weighing up to several pounds have been made. Carbon, oxygen, and nitrogen content are reasonably comparable with commercial wrought titanium. The surface attainable is equal to that of good sandcast metals.

National Research Corp. is now under contract to supply pilot titanium castings to the Ordnance Corps at Watertown Arsenal.

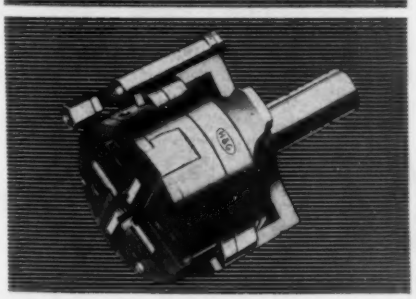
An IDLE man at a BUSY automatic spells PROFIT. ¶ A BUSY man at an IDLE machine spells LOSS. ¶¶ H&G Insert Chaser Die Heads are preferred by screw machine engineers because they spell less down time, lower costs, cleaner, more accurate threads. ¶¶



Style MM
for multiple spindle automatics, chucking machines, drill presses.



Style DMS
for hand screw machines, turret lathes, where die head does not rotate.

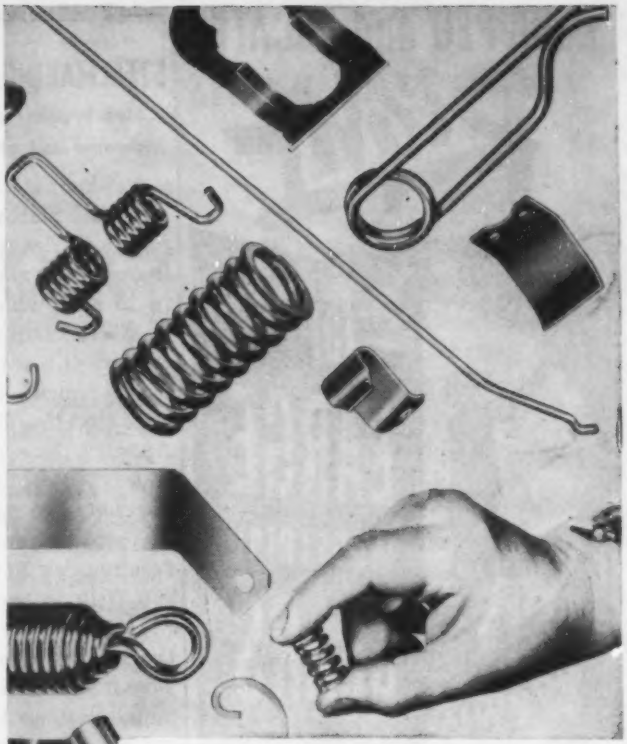


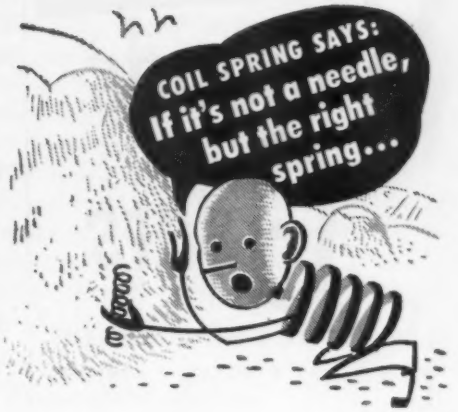
Style DM
for B & S automatics and small single spindle machines.

H&G Insert Chaser DIE HEADS

WRITE FOR "HOW TO SELECT THE PROPER DIE HEAD FOR THE JOB".

THE EASTERN MACHINE SCREW CORPORATION
21-41 Barclay Street, New Haven, Conn.





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SIMONDS also is stock carrying distributor for Ramsey Silent Chain Drives and Couplings; and industrial V-Belts.

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—Technical Briefs—

STEELMAKING:

Slab breaker designed for chrome and other alloys.

Replacing the sledge hammer and ball methods, a new machine has been developed for the breaking of alloy slabs. It accomplishes in 15 min. what formerly took 2½ hr, it is claimed, and thereby increases the output of chrome alloy many times. The machine developed by the R. B. P. Corp., Los Angeles, has a span of approximately 20 ft. It can be built with various size strokes ranging from 42 to 84 in. and delivers 50 to 60 frequencies a minute with a 64,000 ft-lb impact.

The machine foundation carries the machine and the anvil block. The machine is placed on tracks which rest on the top of the foundation, allowing it to travel along the desired length over the slab. The super structure is mounted on dollies on the transverse beams of the machine which allows the operator at all times to move the machine longitudinally and transversely, thereby permitting him to strike the metal slab at any point that he desires. The machine operates pneumatically, both in drive and operation of the impact hammer.

Crane Picks Up Slab

To break a slab, the machine is moved along a runway and a crane picks up a slab and places it on the anvil. The machine then breaks up the slab to the desired size. When this operation is completed the machine is moved to a point on the runway where the operator is able to reach a control valve that operates the hydraulic mechanism that drives a hydraulic bulldozer. This pushes all of the broken material off the slab.

MACHINERY:

New compound reduces wear on friction surfaces.

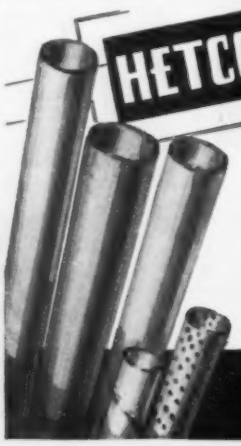
A simple inexpensive method for reducing losses due to wear and tear on friction surfaces of many types of machines is claimed for a compound which combines an alloy of copper, silver and lead.

This new alloy called Cop-Sil-Loy possesses properties over and beyond the basic properties of each single element. It does not melt under temperatures of up to 1250°F and sustains friction up to 900°F. It conducts heat as rapidly as copper, lubricates as well as lead and does not deteriorate like either one of the materials, Cop-Sil-Loy, Inc. says.

Fills In Pores

The compound fills in the pits and pores in the drum and lining surfaces of the braking portion of a machine so that the total contact area of the two friction surfaces is said to be increased 50%. This increase establishes a new and more reliable braking surface.

Extended tests over a period of many months on overhead cranes, drop forge hammers, punch presses, friction drive units, V belt sheaves, and pullies, conveyor belt systems, motor drive units, have indicated that losses due to failure of present friction materials can now be reduced by 90 pct.



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THE IRON AGE SUMMARY . . .

- Iron Age survey finds confident business outlook
- Prospects for 9 of 13 industries are rated 'Good'
- Scrap steel prices take shellacking, market sours

An accurate barometer of the economy, 13 dominant industries in steel and metalworking, responded to an IRON AGE survey with a vote of confidence on future business prospects. Many top-level industrialists significantly regarded as inevitable the easing of record production in late 1953 and 1954 as a return to a more normal market in which solid profits could be made, high operations could continue. (See p. 55)

Opinions indicated that inflation was not a dangerous factor in the industrial economy. Intensifying competition, high-initiative salesmanship were certain to be effective deterrents to price increases. For the consumer this was heartening news, especially since automotive and appliance industries seem determined to hold the line on prices.

Sales outlooks for 9 of the 13 surveyed industries were ranked as Good, 2 as Fair, and only two as Dim. In the Dim grouping was coal.

By year's end steelmaking operations should be easing down to around 90 pct. of capacity, a number of prominent steel men predicted. A slight but gradual decline should continue into 1954. Bottom estimates for '54 steelmaking rates were 85 pct of capacity.

Producing at record through first half '53, appliances should dip to a still-high rate for the second half, enter a high-buying first half in 1954 which will see competition growing.

Declining defense orders inspire varying degrees of pessimism in the machine tool industry which has felt an almost 45 pct cut in order backlogs from a year ago. The emphasis is now on the civilian market.

Detroit believes its market will stay strong for the rest of '53, recede to good level in '54 to the extent the boom plays out.

Awaiting spring to improve their sales charts, farm equipment makers don't see much hope for improvement this year.

Television set producers see continuing high output. This year's production may top 7.5 million sets against 6.1 million in 1952. New stations opening up, a replacement market sprouting make video's future excellent.

The stampings industry witnessed a 2 to 5 pct retreat of business in the second and third quarters of this year but the outlook is generally good because customer industries will maintain high production.

Gray iron and malleable foundries are crying distress. Steel warehouse sales have been running from 8 to 25 pct ahead of the first 7 months last year, will remain strong for rest of 1953.

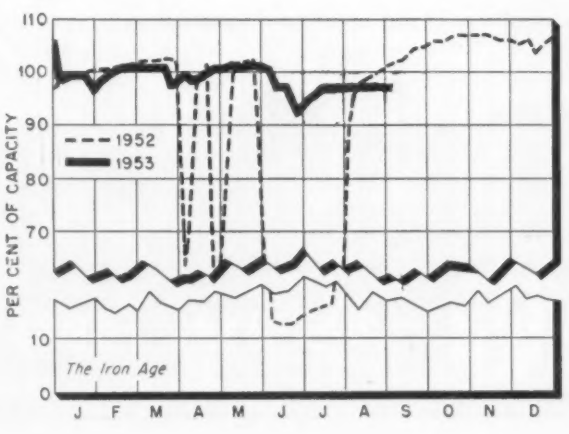
The pulse beat of the scrap iron and steel industry is growing more labored as THE IRON AGE No. 1 heavy melting scrap composite dropped to $40.00 from $41.67 last week and $43.17 the week previous. "Down" sentiments depress the scrap market and buyers' reluctance to place substantial orders have breached price fronts of all scrap centers.

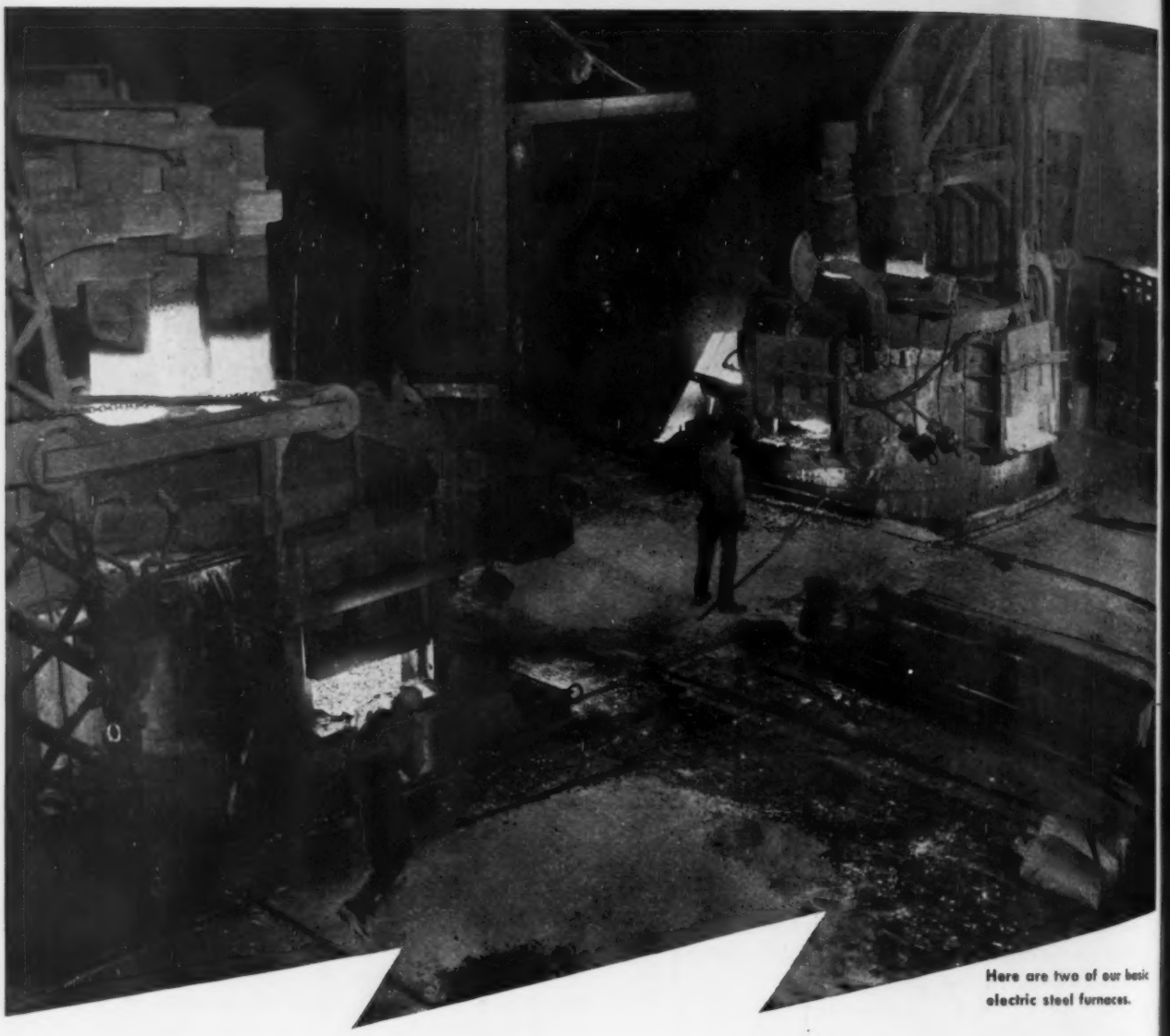
The steel industry is gaging its chances for continued high operations before plunging too heavily into scrap. Because of still towering scrap stockpiles the consumer is in a good position to curtail buying until his output picture clarifies.

Steel Operating Rates

	Week of Aug. 30	Week of Aug. 23		Week of Aug. 30	Week of Aug. 23
Pittsburgh	97.0	92.0*	Detroit	107.0	105.0
Chicago	101.0	97.0	Birmingham	97.0	94.0
Philadelphia	97.5	96.0	Wheeling	96.0	98.0*
Valley	97.0	98.0*	S. Ohio River	80.0	75.5
West	99.0	91.5*	St. Louis	95.0	94.0
Cleveland	98.0	97.0*	East	79.0	89.5*
Buffalo	108.5	106.5	AGGREGATE	95.5	94.0

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.
* Revised.





Here are two of our basic electric steel furnaces.

NATIONAL FORGE *ELECTRIC* STEEL

. . . is used exclusively in all of our forgings. This is to your distinct advantage when you have your forgings National-forged.

Electric Steel can be held to close chemical analysis; it is cleaner; it has lower sulphur and phosphorous content and is more uniform from heat to heat.

These qualities of our steel have enabled us to produce forgings for the armed forces that consistently meet their most exacting specifications.

Your forgings will receive the same meticulous care throughout. So why not have them National-forged next time? We offer our facilities and experience for your service; just write NATIONAL FORGE AND ORDNANCE CO., Irvine, Warren County, Penna.

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

Markets at a Glance

Kaiser Walkout . . . The second wildcat western steel strike in as many weeks cost 2 days production at Kaiser Steel last week. A walkout of 40 maintenance electricians idled about 2200 at Fontana for 49 hours. Banking of furnaces was well underway when pressure by union officials ended the walkout with agreements to arbitrate. Lost production dropped the western ingot rate to 91.7 pct. Two weeks ago Bethlehem's San Francisco mill lost 6 days production in an unauthorized openhearth walkout.

Cash Needed . . . Continuing heavy demand for consumer credit has prompted General Motors Acceptance Corp. to announce it soon will borrow $150 million by selling debentures, to be paid off in 1961. GMAC borrowed $77 million in August and says it may have to seek more cash later to meet customer requirements. Interest rate and price of debentures involved in the $150 million sale were not revealed.

Gas Appliances . . . Shipments of gas ranges have been running 6.1 pct ahead of last year, totaling almost 1.3 million units for the first 7 months of 1953. Demand for electric ranges appears to have dropped, however, as in the first 6 months of this year 800,900 units were delivered as compared with 1,128,100 for the same period last year. Gas-fired central heating equipment (furnaces, boilers, conversion burners) are enjoying strong demand. Shipments of 386,500 units during the first 7 months of 1953 are a 14.2 pct increase over the comparable period last year. July shipments of all gas appliances except boilers showed a downward trend.

Down for Repairs . . . U. S. Steel's South Works at Chicago was putting in repair work on its No. 3 openhearth furnace, its No. 2 electric furnace, and the 44-in. slab mill last week. At the same time three bessemers went out of action because of the openhearth shutdown. The furnaces were scheduled for a 1-week shutdown.

October Blow . . . Brazil's Volta Redonda steel mill will blow in a new blast furnace next month. The new furnace, together with supporting new facilities will boost annual steel output from 500,000 to over 700,000 ingot tons.

Scrap Slumps . . . Scrap iron and steel continued its downward skid at almost all steelmaking centers. Movement is low, in many cases coming to life only when prices were cut still further. THE IRON AGE Steel Scrap Composite fell $1.67 this week to $40.00 per gross ton. This came on the heels of a $1.50 dip last week and a drop of $1.25 the week before.

Industrial Furnaces . . . Industrial furnaces industry is just about keeping up with the 1952 level, as volume for the first half is rated at 93 pct of last year's. Unfilled orders were valued at $53,576,778.

Too Poor . . . U. S. Steel Corp.'s million-dollar gamble for iron ore underlying Norfolk County, south of Simcoe, Ont., has proved a loss. Several months of intensive diamond drilling have shown that ore deposits were not of sufficient high grade to warrant deep mining operations. Options taken on some 60 farms in Norfolk County by Canada Permanent Trust Co. of Toronto, for the corporation, will not be taken up.

Plumbing Fixtures . . . Manufacturers' shipments of plumbing fixtures during the second quarter were valued at $69.8 million, an increase of 3 pct over the first quarter and a 7 pct jump over second quarter 1952.

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Last Week	Month Ago	Year Ago
Composite Prices				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	$56.76	$56.76	$56.76	$55.26
Scrap, No. 1 hvy. (gross ton)	$40.00	$41.67	$44.58	$42.00
Nonferrous Metals				
Aluminum, ingot	21.50	21.50	21.50	20.00
Copper, electrolytic	29.50	29.50	29.50	24.50
Lead, St. Louis	13.80	13.80	13.55	15.80
Magnesium, ingot	27.00	27.00	27.00	24.50
Nickel, electrolytic	63.08	63.08	63.08	59.58
Tin, Straits, N. Y.	83.00	82.25	78.25	$1.21¼
Zinc, E. St. Louis	11.00	11.00	11.00	14.00

Buy Chilean Copper, Say Mobilizers

DMB recommends State Dept. negotiate with Chile for 84,000-ton surplus . . . Aluminum stockpile in for big fourth quarter boost . . . Could support market—By *R. L. Hatschek.*

As expected, the Defense Mobilization Board last week recommended that the State Dept. negotiate for purchase of the 84,000-ton Chilean copper surplus. But that's as much information as the officials would disclose.

This recommendation followed shortly after Chile's announcement that it would sell its copper to "anyone"—including the Communist countries—if the U. S. would not buy. Russia is currently thought to be short of copper and the U. S. doesn't want this to change.

But How Much? . . . Consideration must be given to several factors in determining the selling price. The Russian shortage, the Chilean financial difficulties, replenishment of the U. S. strategic stockpile, certain other possible diplomatic considerations, and the difference between the Chilean asking price of 36½¢ and the world market price of 29¢.

Add to this the confusion created by other copper sources who feel that if the U. S. granted Chile a "bonus" price it would constitute discrimination.

Copper Market Easy . . . All this is in the face of a definitely soft copper market. Consumers, sure that the present 29¢ to 30¢ per lb quotation can't last, are just not buying any of the red metal. Meanwhile, producers and custom smelters continue to hang on at these price levels.

Scrap copper and brass prices are edging higher, particularly at dealer level. Ingot makers will now pay as high as 23½¢ per lb of No. 1 copper, 21½¢ per lb of No. 2 and 20¢ per lb of light copper.

More Stockpiling . . . If the government purchases the entire 84,000-ton Chilean stock of copper it will almost exactly cover the withdrawals made during the recent shortage period—something that was supposed to be done.

And the federal aluminum stockpile is now scheduled for a record increase in the fourth quarter. Office of Defense Mobilization refuses to disclose tonnages for security reasons but says fourth quarter diversion of metal will be the "largest quantity to be delivered to the stockpile in any quarter to date."

More Available . . . The agency now estimates 1953 domestic primary aluminum production will total 1.26 million tons, compared with about 937,000 tons last year, 837,000 tons in 1951 and 719,000 tons in 1950.

Current and future reductions in aluminum requirements by military and atomic energy contractors will make heavier tonnages available to civilian manufacturers. Barring power difficulties in the Pacific Northwest, fourth quarter availability of aluminum to civilian users should be the greatest for that period than at any previous time.

Easing Slowly . . . While most aluminum salesmen were expecting to have to get busy sometime about first quarter of 1953, a heavier stockpiling program might easily delay the softening. In addition to record availability predicted for the light metal, many new uses for aluminum have pushed demand way up.

Exports Up . . . Exports of primary aluminum by Aluminum Co. of Canada, Ltd., for the current year are running well ahead of those for 1952, reflecting sharply increased production by the company.

For the 7 months ending with July aluminum exports to all countries totaled 241,670 metric tons, which compares with 454,500 metric tons for the whole of 1952. Sales to the U. S. accounted for more than half of the 1953 total at 122,100 tons against 104,100 tons for all of 1952; exports to the United Kingdom amounted to 97,070 tons against 234,500 tons in all of 1952. This reflects deals made to divert aluminum under contract from the U. K. to the U. S.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in August, based on quotations appearing in THE IRON AGE were as follows.

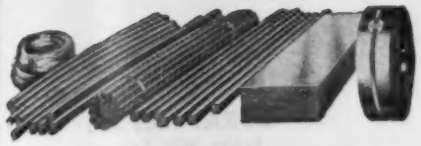
	Cents Per Pound
Electrolytic copper, Conn. Valley	29.385
Lake Copper, delivered	30.125
Straits tin, New York	80.714
Zinc, East St. Louis	11.000
Zinc, New York	11.526
Lead, St. Louis	13.800
Lead, New York	14.000

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Aug. 26	Aug. 27	Aug. 28	Aug. 29	Aug. 31	Sept. 1
Copper, electro, Conn.	29.00–30.00	29.00–30.00	29.00–30.00	29.00–30.00	29.00–30.00	29.00–30.00
Copper, Lake delivered	30.125	30.125	30.125	30.125	30.125	30.125
Tin, Straits, New York	83.00	82.25	82.50	....	83.00	83.00*
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	13.80	13.80	13.80	13.80	13.80	13.80

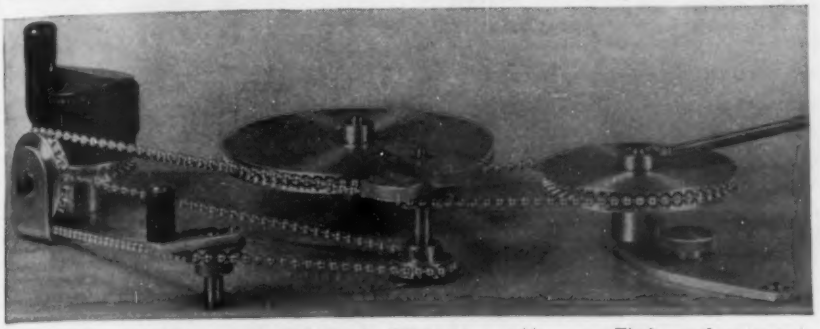
Note: Quotations are going prices
*Tentative



BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

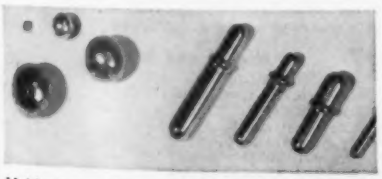


New low-cost Bead Belt — a sprocket drive for TV tuners, machines, etc. Timing and movement accurately controlled because slippage and backlash are avoided. Courtesy The Bead Chain Manufacturing Co., Bridgeport, Conn.

Uses of Multi-Swaging Products Challenge Imagination

Do you know that multi-swage products are among the most familiar items of everyday use? Examples are bead chain of a thousand uses; radio tube pins, terminals, jacks, contact pins and friction fasteners for electronic, electrical, and mechanical devices; stop pins, dowel pins, rest pins for appliances and novelties; spacers; shaft bearings for toys and other light duty applications.

Just how and where multi-swage products can be used advantageously



Multi-swage products — hollow tubular parts with tightly swaged seams — are widely used for contact pins, terminals, jacks, and sleeves. Friction fasteners made by this process retain their spring properties remarkably well. Courtesy The Bead Chain Manufacturing Co., Bridgeport, Conn.

for new applications in modern design is up to the imagination of designers and engineers.

Efficient and Economical

The multi-swage products illustrated are made by The Bead Chain Manufacturing Company, Bridgeport, Conn. They are mainly produced from annealed narrow width strip brass (70-30) of uniformly close tolerances for composition, temper, gauge and flatness. Strip is fed into an extremely ingenious but very complicated high-speed automatic machine. It operates similar in principle to the eyelet machine except that some of the stages are designed for multiple swaging. This operation causes the metal to flow into the proper form of the product design and results in an article which is extremely work hardened with accompanying great strength and stiffness.

Multi-swage products are hollow and have a longitudinal seam which remains tightly closed because of the stresses imparted from the swaging operation. When forced apart by a tapered pin, a strong spring pressure is developed. When the pin is removed, the seam closes tightly even after the above operation is repeated thousands of times. Sizes range up to a maximum of ¼" diameter and 1½" long.

Because of the minimum waste involved, and high speed of manufacture, the multi-swage method is more economical than other methods of manufacture for producing small tubular parts in large volume. Other advantages are dimensional accuracy and a variety of shapes. Fitting up charges for tooling, etc., for new items are surprisingly modest.

The New Bead Belt

Outstanding features of bead chains are nonkinking, low friction, and unusually great strength in proportion to its weight, especially in the small sizes. Tensile strength ranges from 15 pounds to 200 pounds depending upon size and metal used.

A new development in the accurate spacing of the beads and an ingenious method of closing the ends has led to the manufacture of a belt drive from bead chain. Specially designed sprockets fit the individual beads and eliminate slippage and backlash. Timing and movement of various parts are accurately controlled.

It is being applied in TV tuners, eliminating costly gearing mechanisms. Other applications are for timing devices, recorders, air conditioners, etc.

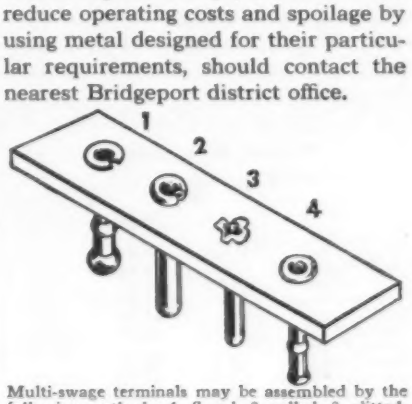
Many Alloys Used

Aside from brass, other alloys are used. Nickel Silver (copper 65%, nickel 18%, zinc remainder) is excellent as a white base for silver plated goods or for higher strength.

For decorative jewelry, Red Brass (85% copper, 15% zinc), and Commercial Bronze (90% copper, 10% zinc) are used because of their rich, golden colors.

For high strength and resistance to corrosion and wear, Silicon Bronze 609 (98% copper and 2% silicon) and Phosphor Bronze 35 (95% copper, 5% tin and 0.15% phosphorus) are recommended.

Bridgeport Brass Company is always glad to work with customers who have special metal requirements, as exemplified by multi-swage process which calls for careful control of uniformity and accuracy in gauge and temper. Fabricators desiring to improve their products through the selection of superior alloys, or who wish to reduce operating costs and spoilage by using metal designed for their particular requirements, should contact the nearest Bridgeport district office.



Multi-swage terminals may be assembled by the following methods: 1. flared; 2. rolled; 3. slitted, or 4. spun. Courtesy The Bead Chain Manufacturing Co., Bridgeport, Conn. (336)

Nonferrous Prices

(Effective Sept. 1, 1953)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136-in. and thicker, 2S, 3S, 53.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢. 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢. 0.032-in. 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.4¢ to 82.8¢; 12 to 14, 38.2¢ to 99.0¢; 24 to 26, 40.9¢ to $1.29; 36 to 38, 45.4¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.499-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 41.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 66¢; 3/16 in., 68¢; ½ in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specifications grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ⅓ to ⅜ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ⅜ in. diam, 10,000 lb; ⅜ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	48.51	....	50.58
Copper, h-r	50.48	46.83	....
Copper, drawn	....	48.08	....
Low brass	45.99	45.68	....
Yellow brass	42.87	42.56	....
Red brass	47.11	46.80	....
Naval brass	47.01	41.07	42.33
Leaded brass	....	....	39.95
Com. bronze	48.76	48.45	....
Mang. bronze	50.73	44.62	46.18
Phos. bronze	70.50	70.75	....
Munts metal	44.91	40.47	41.72
Ni silver, 10 pct	56.56	59.83	62.89

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, per lb conta'd Be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	29.00 to 30.00
Copper, Lake, delivered	30.125
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	13.80
Lead, New York	14.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	27.00
Magnesium, sticks, 100 to 500 lb.	45.00 to 47.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$188 to $191
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$93.00
Silver, New York, cents per oz.	85.25
Tin, New York	83.00
Titanium, sponge	$5.00
Zinc, East St. Louis	11.00
Zinc, New York	11.25-11.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	24.50
No. 120	23.75
No. 123	23.25
80-10-10 ingot	
No. 305	28.75
No. 315	26.50
88-10-2 ingot	
No. 210	37.50
No. 215	34.00
No. 245	29.50
Yellow ingot	
No. 405	20.75
Manganese bronze	
No. 421	25.25

Aluminum Ingot

(Cents per lb del'd, 30,000 lb and over)

95-5 luminum-silicon alloys	
0.30 copper, max.	24.50-25.00
0.60 copper, max.	24.00-24.75
Piston alloys (No. 122 type)	22.50-23.00
No. 12 alum. (No. 2 grade)	21.75-22.50
108 alloy	22.50-23.00
195 alloy	22.50-24.00
13 alloy (0.60 copper max.)	24.00-24.75
ASX-679	22.50-22.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	23.75-24.00
Grade 2—92-95%	22.50-23.00
Grade 3—90-92%	21.50-22.00
Grade 4—85-90%	20.50-21.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	45.14
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	85.00
Rolled, depolarized	86.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 30,000 lb and over)

	Heavy	Turnings
Copper	28⅝	27⅜
Yellow brass	21⅝	19⅝
Red brass	25⅛	24⅝
Comm. bronze	26⅛	25⅝
Mang. bronze	20	19¼
Brass rod ends	19¾	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	23
No. 2 copper wire	21½
Light copper	20
*Refinery brass	18½

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

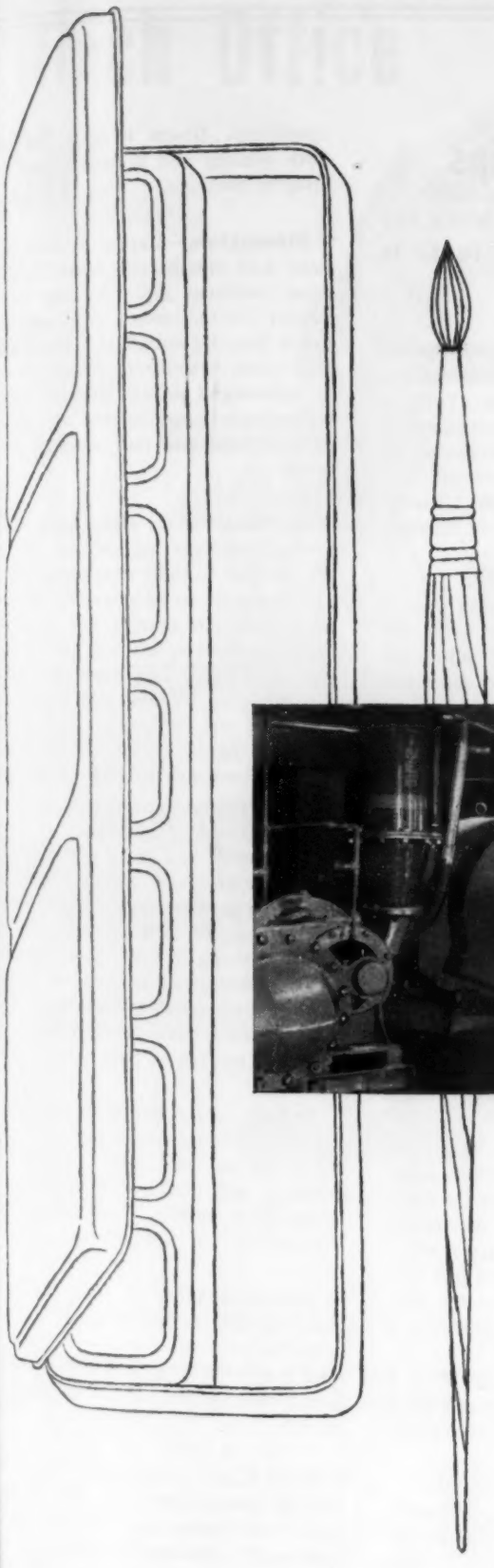
No. 1 copper wire	23 —23⅛
No. 2 copper wire	21 —21½
Light copper	19½—20
No. 1 composition	17 —17⅛
No. 1 comp. turnings	16½—17
Rolled brass	14 —14½
Brass pipe	15 —16
Radiators	12⅜—13
Aluminum	
Mixed old cast	12½—13½
Mixed new clips	14 —14½
Mixed turnings, dry	13 —13½
Pots and pans	12½—13½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

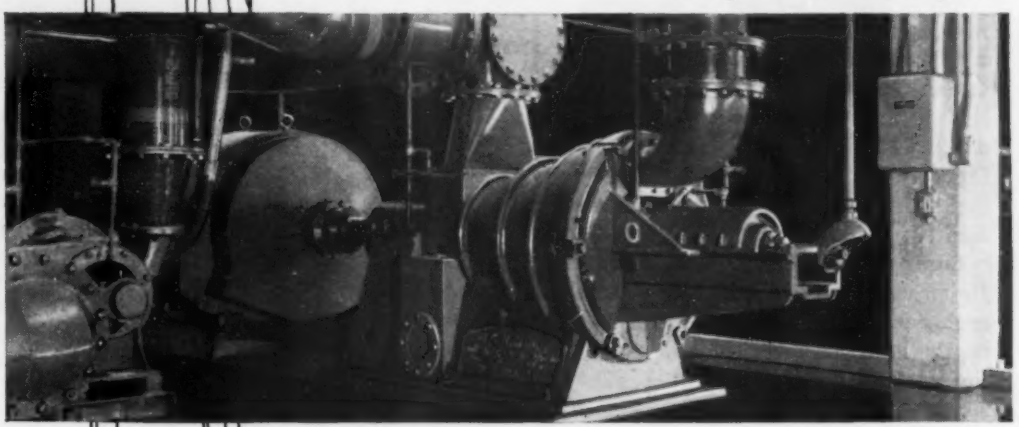
Copper and Brass	
No. 1 heavy copper and wire	21 —22
No. 2 heavy copper and wire	19 —20
Light copper	16½—17½
New type shell cuttings	16½—17½
Auto radiators (unsweated)	11 —11½
No. 1 composition	15 —16
No. 1 composition turnings	14½—15½
Unlined red car boxes	13 —13½
Cocks and faucets	13 —13½
Mixed heavy yellow brass	10 —10½
Old rolled brass	13 —13½
Brass pipe	14½—15
New soft brass clippings	18½
Brass rod ends	17½
No. 1 brass rod turnings	18
Aluminum	
Alum. pistons and struts	6½
Aluminum crankcases	9
2S aluminum clippings	13
Old sheet and utensils	9
Borings and turnings	6½
Misc. cast aluminum	9
Dural clips (24S)	10
Zinc	
New zinc clippings	5½— 6½
Old zinc	4 — 4½
Zinc routings	2½— 3
Old die cast scrap	3 — 3½
Nickel and Monel	
Pure nickel clippings	80
Clean nickel turnings	50
Nickel anodes	80
Nickel rod ends	80
New Monel clippings	30 —33
Clean Monel turnings	23 —25
Old sheet Monel	28 —30
Nickel silver clippings, mixed	14
Nickel silver turnings, mixed	12
Lead	
Soft scrap, lead	11 —11½
Battery plates (dry)	6¼— 6½
Batteries, acid free	4.60— 4.70
Magnesium	
Segregated solids	20 —21
Castings	19 —20
Miscellaneous	
Block tin	65 —67
No. 1 pewter	42 —45
No. 1 auto babbitt	37 —38
Mixed common babbitt	11½—12½
Solder joints	15 —15½
Siphon tops	35
Small foundry type	15½—16
Monotype	14 —14½
Linotype and stereotype	13 —13½
Electrotype	11 —11½
Hand picked type shells	7 — 8
Lino. and stereo. dross	5 — 5½
Electro dross	4½— 5

partners
in papermaking



With the distinction of having introduced cast stainless steels into the paper industry and having been a leader in the development of alloy materials required for handling sulphite and sulphate liquors or for withstanding the combination of abrasion and corrosion brought on during hydration, fibrillation and fraying of the fiber, Cooper Alloy has long enjoyed an enviable partnership with producers of pulp and paper.

And as this amazing industry continued to keep in step with the demands of an expanding population and an evergrowing industrial need, it has learned to call with confidence upon the experience and know-how of Cooper Alloy engineers, metallurgists, designers and foundrymen.



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PP

Buyer Pulls in His Head, Market Slips

Prices in all scrap centers hit the downtrail . . . Many see further price cuts . . . Steel scrap prices off $1 to $2 in Pittsburgh . . . Sales dwindle in all districts.

The scrap consumer showed just how firmly he was in the driver's seat as prices in all scrap centers took another downturn. The market's outlook, temporarily at least, was pitch black and reports were rife that steel mills were further curtailing buying, thinking of dropping prices. The consumer was withdrawing, waiting for his production picture to clarify. (See p. 59.)

Scrap volume hinges on the steelmaking rate. If it drops less scrap will be sold. But experienced scrap traders still look for the silver lining, insisting that even as low as an 85 pct of capacity steelmaking rate next year leaves plenty of opportunity for heavy scrap shipments.

Scrap was at its turning point. Its prospects will improve considerably when consumers reduce currently high inventories and enter the market on a constant basis. Across the country, price drops were the rule rather than the exception and IRON AGE'S No. 1 steel composite dropped to $40.00 from last week's $41.67.

Pittsburgh — Openhearth scrap prices are off $1 to $2 per ton here this week. Market continues weak in face of scattered buying and prospects of a reduced ingot rate in fourth quarter. Consensus is that prices may slip off even further if present trend continues. On basis of a purchase, No. 2 steel and No. 2 bundles are off $2 per ton to $38 and $36, respectively. No. 1 heavy melting dropped $1 in sympathy. Low phos, blast furnace grades, railroad material, and cast also were down.

Chicago—There was a dearth of orders in Chicago last week and even broker to broker sales were dwindling. Foundry grades were particularly hard hit, until a downward revision by one mill further reduced the already skidding prices on steelmaking and electric furnace grades. Turning price orders were almost nonexistant, and a price decline was expected as old orders were taken care of. Revised purchase prices on No. 1 heavy, No. 1 railroad, and electric furnace confirmed the down trend.

Philadelphia — Steelmaking grades dropped anywhere from 50¢ to $2 per gross ton here this week. Trading has been light and the market is described as "bad" by dealers in particular. In some quarters there is optimism for better business following the Labor Day weekend.

New York—Prices deflated almost across the board as substantial orders failed to materialize. The outlook was temporarily pitch black. One eastern mill bought at a curtailed rate at prices now considered respectable. There was talk of further price cuts. All steelmaking grades, including No. 1 heavy melting dropped at least $1. Turnings were softer. In a down market, cast prices were taken down.

Detroit—Murder is the way one broker described the market here. Most consumers pulled out of the market at once, taking prices downward with them. Automotive lists went close to last month's pattern but bidding was spotty and mostly for tonnages that already had a home. Talk here is about one broker who bid speculatively and got caught with a large tonnage. No. 1 grades generally dropped $2 and $3 and all secondary grades followed.

Cleveland — One large consumer here has held up shipments to all plants. This move coupled with limited buying of No. 2 steel in the Valley has sent openhearth prices down from $2 to $4. In the complete absence of buying No. 1 heavy melting dropped $3 on appraisal to $42 and $43 in Cleveland and Youngstown respectively. Gloom is heavy here as both dealers and brokers expect the slide to continue.

Birmingham—Market for blast furnace and openhearth grades in this area continues dull. A large buyer placed limited orders with specified yards that did not affect prices. There was some activity in foundry scrap at unchanged prices. Brokers report more scrap is coming into some yards while others still lack adequate supplies.

St. Louis—Steel mills have withdrawn from the market, relying for the present on their inventories. They are expected to re-enter the market for the fourth quarter, but at prices below present quotations, which are generally below last week. But mills are expected to take into consideration that too-low prices can dry up supplies. In line with the mills' situation, brokers are holding off making commitments.

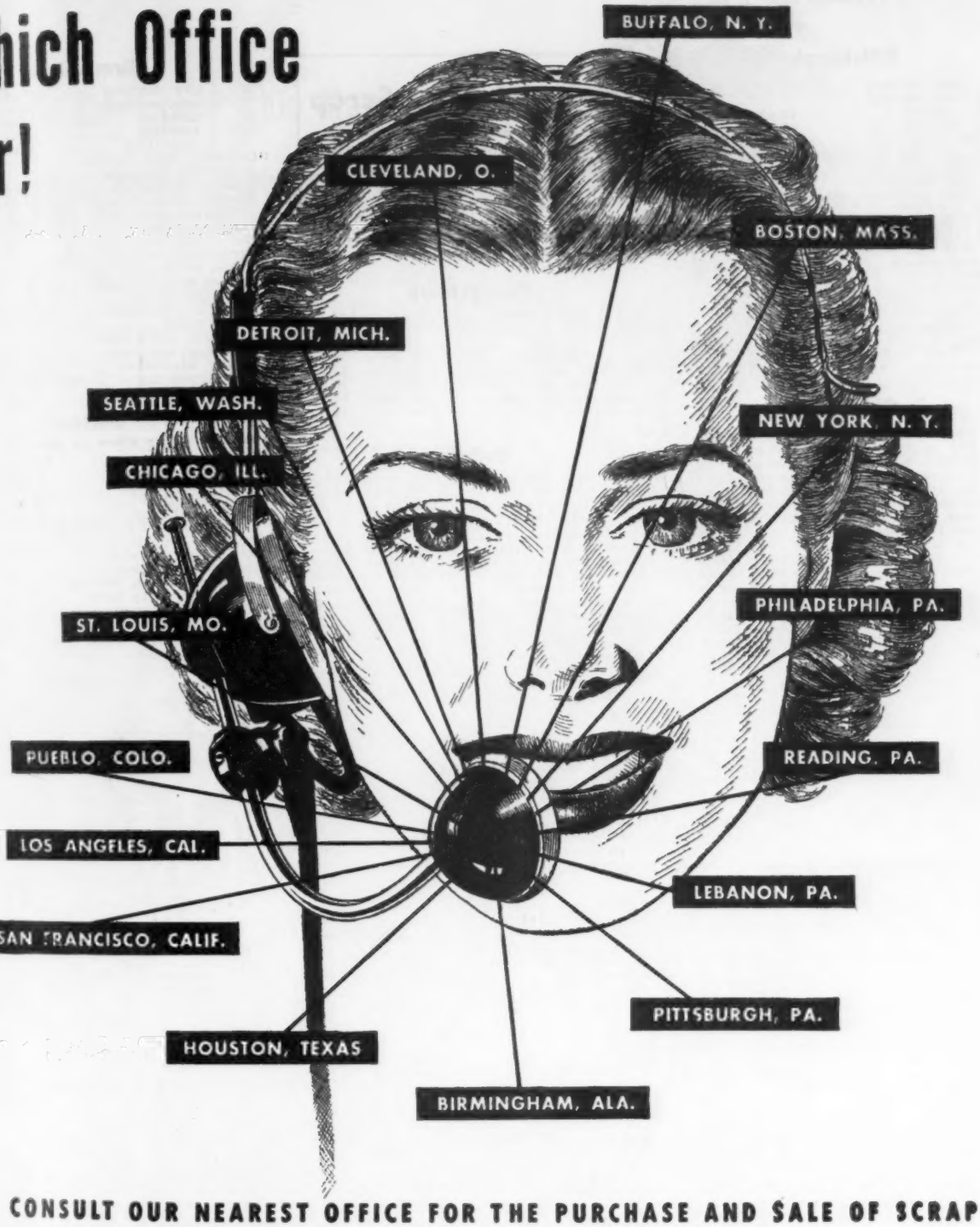
Cincinnati — Falling prices in adjoining areas and complete lack of local consumption has Cincinnati scrap dealers caught in a crossfire. No. 1 heavy melting is down to $35 on appraisal. Informed sources say openhearth grades will automatically dip another $2 if local mills don't come into the market in September.

Buffalo — Decided weakness grips market with prices off an additional $1 a ton on small orders placed by leading mill. Consumer refused to place large orders. Cast prices also dropped $1 on new sales.

Boston—Trading in New England scrap circles in the past week was even duller than the previous week. No. 1 steelmaking grades dipped $1 per ton and No. 2 grades are $2 easier.

West Coast — San Francisco mill buying prices dropped $1 across the board for September deliveries with continued softening of demand. One mill has cut back purchases substantially while others remain largely unchanged. Cupola cast demand by foundries perked up, settling at the top of the range both in Los Angeles and San Francisco.

Which Office Sir!



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CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Prices

(Effective Sept. 1, 1953)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and ms. turns.	25.00 to 26.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs, plate	45.00 to 46.00
Heavy turnings	37.00 to 38.00
No. 1 RR. hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	53.00 to 54.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	48.00 to 49.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	38.00 to 39.00
Malleable	46.00 to 47.00

Chicago

No. 1 hvy. melting	$36.00 to $38.00
No. 2 hvy. melting	31.00 to 33.00
No. 1 factory bundles	39.00 to 41.00
No. 1 dealers' bundles	36.00 to 38.00
No. 2 dealers' bundles	29.00 to 31.00
Machine shop turn.	17.00 to 19.00
Mixed bor. and turn.	20.00 to 22.00
Shoveling turnings	20.00 to 22.00
Cast iron borings	19.00 to 21.00
Low phos. forge crops	45.00 to 46.00
Low. phos. punch'gs, plate	39.00 to 41.00
Low phos. 3 ft and under	38.00 to 40.00
No. 1 RR. hvy. melting	38.00 to 40.00
Scrap rails, random lgth.	44.00 to 46.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	52.00 to 53.00
Locomotive tires, cut	44.00 to 45.00
Cut bolsters & slide frames	43.00 to 45.00
Angles and splice bars	44.00 to 46.00
RR. steel car axles	49.00 to 51.00
RR. couplers and knuckles	44.00 to 45.00
No. 1 machinery cast	40.00 to 42.00
Cupola cast	36.00 to 38.00
Heavy breakable cast	35.00 to 36.00
Cast iron brake shoes	36.00 to 37.00
Cast iron car wheels	39.00 to 40.00
Malleable	43.00 to 44.00
Stove plate	34.00 to 35.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	40.00 to 41.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	24.00 to 26.00
Mixed bor., short turn.	26.00 to 28.00
Shoveling turnings	28.00 to 30.00
Clean cast chem. borings.	38.00 to 39.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft and under	45.00 to 46.00
Low phos. punchings	45.00 to 46.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	39.00 to 40.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	40.00 to 41.00
Cast iron carwheels	45.00 to 46.00
Malleable	45.00 to 46.00
Unstripped motor blocks.	30.00 to 31.00
No. 1 machinery cast.	45.00 to 46.00
Charging box cast.	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$40.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 42.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	40.00 to 42.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. 2 ft and under	44.00 to 45.00
Drop forge flashings	41.00 to 42.00
No. 1 RR. hvy. melting	44.00 to 45.00
Rails 3 ft and under	51.00 to 52.00
Rails 18 in. and under	53.00 to 54.00
Railroad grate bars	37.00 to 38.00
Steel axle turnings	35.00 to 36.00
Railroad cast	46.00 to 47.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	41.00 to 42.00
Malleable	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	46.50 to 47.50

Buffalo

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 37.50
No. 1 busheling	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	35.00 to 35.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	28.00 to 28.50
Shoveling turnings	29.00 to 29.50
Cast iron borings	28.00 to 28.50
Low phos. plate	42.00 to 43.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	50.00 to 50.50
RR. spring steel	50.00 to 50.50
RR. couplers and knuckles	50.00 to 50.50
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	37.00 to 38.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles, openhearth	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
New busheling	33.00 to 34.00
Drop forge flashings	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Electric furnace, bundles	36.00 to 37.00
Low phos. punch'gs, plate	36.00 to 37.00
No. 1 cupola cast.	43.00
Heavy breakable cast.	33.00
Stove plate	35.00
Automotive cast.	43.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 bundled sheets	28.00 to 30.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 21.00
Cast iron borings	17.00 to 18.00
No. 1 RR. hvy. melting	39.00 to 40.00
Rails, random lengths	43.50 to 44.50
Rails 18 in. and under	48.00 to 49.00
Locomotive tires, uncut	41.00 to 43.00
Angles and splice bars	45.00 to 46.00
Std. steel car axles	45.00 to 46.00
RR. spring steel	44.00 to 45.00
Cupola cast.	40.00 to 41.00
Hvy. breakable cast.	32.00 to 33.00
Cast iron brake shoes	39.00 to 40.00
Stove plate	34.00 to 35.00
Cast iron car wheels	42.00 to 43.00
Malleable	43.00 to 45.00
Unstripped motor blocks.	32.00 to 33.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	$28.00 to 29.00
No. 2 bundles	26.00 to 27.00
Low phos. 2 ft and less.	35.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Clean cast chem. borings.	28.00 to 29.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	32.00 to 32.50
Charging box cast.	32.00
Heavy breakable cast.	32.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$28.00 to $28.50
No. 2 hvy. melting	26.00 to 26.50
No. 1 bundles	28.00 to 28.50
No. 2 bundles	24.00 to 24.50
No. 1 busheling	28.00 to 28.50
Machine shop turn.	20.75 to 21.75
Shoveling turnings	22.75 to 23.75
Cast iron borings	22.75 to 23.75
Electric furnace bundles	28.00 to 28.50
Bar crops and plate	34.00 to 34.50
Structural and plate, 2 ft.	32.00 to 32.50
No. 1 RR. hvy. melting	30.00 to 30.50
Scrap rails, random lgth.	39.00 to 40.00
Rails, 18 in. and under	42.00 to 43.00
Angles & splice bars	42.00 to 43.00
Std. steel axles	43.00 to 44.00
No. 1 cupola cast.	41.00 to 42.50
Stove plate	38.00 to 39.50
Cast iron car wheels	34.00 to 35.00
Charging box cast.	29.00 to 30.00
Heavy breakable	25.00 to 26.00
Unstripped motor blocks.	32.00 to 33.00
Mashed tin cans	17.00 to 18.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	29.00 to 30.00
Elec. furnace, 3 ft & under	29.00 to 30.00
Machine shop turn.	15.50 to 16.00
Mixed bor. and short turn.	18.50 to 19.00
Shoveling turnings	19.50 to 20.00
Clean cast chem. borings.	27.17
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	30.00
Stove plate	24.00 to 24.50
Unstripped motor blocks.	22.00

Cincinnati

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $35.00
No. 2 hvy. melting	30.00 to 32.00
No. 1 bundles	33.00 to 35.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. & under	44.00 to 45.00
Rails, random lengths	44.00 to 45.00
Rails, 18 in. and under	53.00 to 54.00
No. 1 cupola cast.	42.00 to 43.00
Hvy. breakable cast.	37.00 to 38.00
Drop broken cast.	48.00 to 49.00

San Francisco

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	23.00
No. 1 bundles	24.00
No. 2 bundles	21.00
No. 3 bundles	17.00
Machine shop turn.	9.00
Cast iron borings	14.00
No. 1 RR, hvy. melting	27.00
No. 1 cupola cast.	39.00

Los Angeles

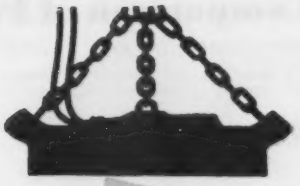
No. 1 hvy. melting	$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
No. 3 bundles	16.00
Mach. shop turn.	8.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. fur. 1 ft and under.	29.00
No. 1 RR, hvy. melting	24.00
No. 1 cupola cast.	39.50

Seattle

No. 1 hvy. melting	$31.00
No. 2 hvy. melting	$27.00 to 29.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 1 cupola cast.	35.00
Mixed yard cast.	

Hamilton Ont.

No. 1 hvy. melting	$32.00
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	26.50
Bushelings	27.50
Bush., new fact. prep'd.	30.50
Bush., new fact. unprep'd.	22.50
Short steel turnings	22.50
Mixed bor. and turn.	26.50
Rails, remelting	32.50
Rails, rerolling	41.50
Cast scrap	41.00



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CHESTER BLAND
President

Comparison of Prices

(Effective Sept. 1, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 1 1953	Aug. 25 1953	Aug. 4 1953	Sept. 2 1952
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.575	5.575	5.575	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.00	9.00	9.00	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	36.75*
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.15¢	4.15¢	4.15¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	31.50*
Wrought iron bars	10.05	10.05	10.05	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.225¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$59.00
Slabs, rerolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
Finished Steel Composite: (per pound)				
Base price	4.664¢	4.634¢	4.634¢	4.376¢

* Add 4.7 pct.

	Sept. 1 1953	Aug. 25 1953	Aug. 4 1953	Sept. 2 1952
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$62.19	$62.19	$62.19	$54.49
Foundry, Valley	56.50	56.50	56.50	55.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	58.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago†	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	61.27	61.27	61.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago†	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	8.95¢
Pig Iron Composite: (per gross ton)				
Pig iron	$56.76	$56.76	$56.76	$55.26
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$42.50*	$43.50	$45.50	$43.00*
No. 1 steel, Phila. area	*40.50*	42.50	44.25	41.50*
No. 1 steel, Chicago	*37.00*	39.00	44.00	41.50*
No. 1 bundles, Detroit	*36.50*	40.50	40.50	41.15*
Low phos., Youngstown	*47.00*	48.50	48.50	46.50*
No. 1 mach'y cast, Pittsburgh	*48.50*	49.50	49.50	52.00
No. 1 mach'y cast, Philadel'a	45.50	45.50	46.50	52.00†
No. 1 mach'y cast, Chicago	*41.00*	43.00	46.50	48.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$40.00*	$41.67	$44.58	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.50‡	29.50‡	29.50‡	24.50
Copper, Lake, Conn.	30.125	30.125	30.125	24.625
Tin, Straits, New York	83.00†	82.25*	78.25	91.25
Zinc, East St. Louis	11.00	11.00	11.00	14.00
Lead, St. Louis	13.80	13.80	13.55	15.80
Aluminum, virgin ingot	21.50	21.50	21.50	20.00
Nickel, electrolytic	63.08	63.08	63.08	59.58
Magnesium, ingot	27.00	27.00	27.00	24.50
Antimony, Laredo, Tex.	34.50	34.50	34.50	39.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. Prices quoted on Ferroalloy pages, 76 pct Mn base

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	.....	.....
Everett *M6*	.....	63.25	63.75	57.00	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	56.50	57.00	61.00
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	56.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	60.00	60.50	61.00	61.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1*, $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Manganese as above Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEELS

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50–46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25–37.50	37.50	39.75	39.75	59.00	45.75–46.00	51.25	30.00	30.50–31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25–38.50	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*; (type 316 add 4.5¢) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa. *W2*; (type 316 add 4.5¢); W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7*; Wallingford, Conn., *W1*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *J4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

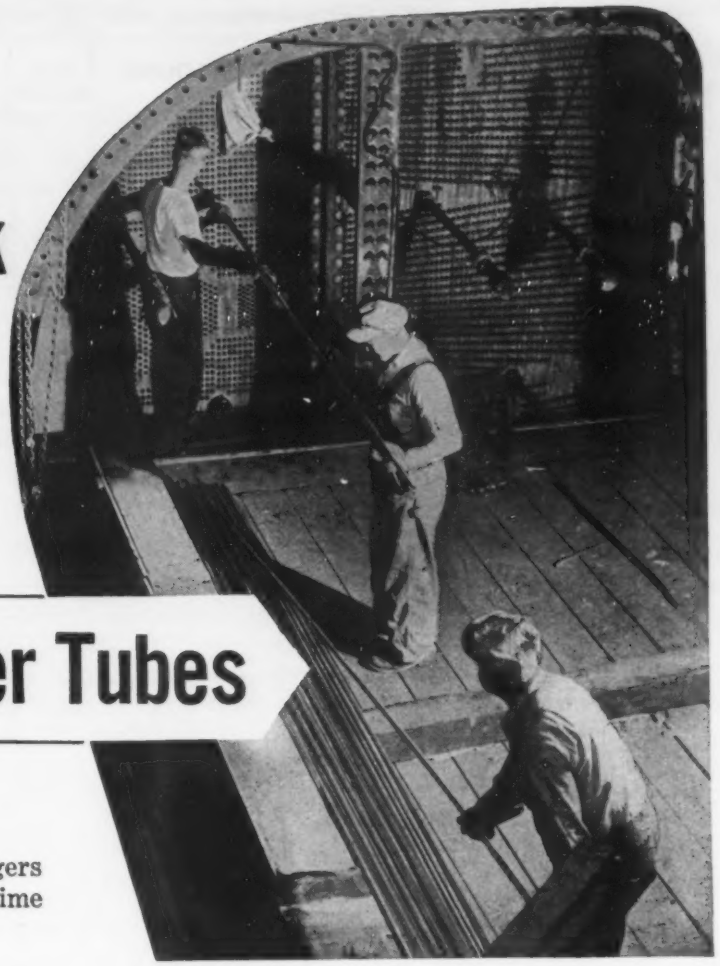
Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

One Way to Lick Corrosion and Wear of Heat Exchanger Tubes



Anaconda 70-30 Cupro-Nickel Tubes, produced by AMERICAN BRASS COMPANY, Waterbury, Conn., were used to replace tubing of Admiralty Metal at the Harbor Steam Plant, Dept. of Water and Power, City of Los Angeles, Calif. View shows men retubing part of a 70,000 sq. ft. surface twin-condenser with 5,878 Anaconda cupro-nickel tubes ⅞" O.D. x 26' 3" long, serving a 75,000 KW turbine.

It takes a lot of handling to retube heat exchangers ... and while the job goes on, equipment downtime plays mischief with production.

Minimize the risk of such shutdowns. Wherever heat-transfer capacity is a factor, especially where wall thickness of tubes allows but little tolerance for effects of corrosion and erosion, specify 70-30 cupro-nickel tubes.

Thin walls of this strong tough alloy resist corrosive and erosive attacks from all sorts of cooling media including polluted, silt-laden harbor water.

Along with ability to withstand a wide variety of corrosive agents, the 70-30 cupro-nickel tubing provides outstanding resistance to pitting and stress corrosion cracking.

* * *

Aship or ashore, this alloy gives unsurpassed performance in vital parts of equipment exposed to salt water corrosion.

In power generator stations, sugar mills, oil refineries and similar plants . . . cupro-nickel alloys serve in feed water heaters, condensers, evaporators and other heat exchangers, and in oil coolers, stills, water boxes, piping, tanks, and other equipment. Cupro-nickel alloys minimize maintenance and replacement expense, loss of heat transfer capacity and interruptions of operation resulting from corrosion.

Cupro-nickel is produced in tubing, rod, strip, wire and sheet, and also in cast form. We shall be glad to give you additional information and help you select the one best suited to your requirements. Write us today.

At the present time, nickel is available for the production of cupro-nickel and other alloys containing nickel, for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

STEEL PRICES

(Effective Sept. 1, 1958)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PILING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$82.00 *B3*			4.15 *B3*	6.20 *B3*				
	Buffalo, N. Y.			$62.00 *B3*	$75.50 *B3, R3*	$82.00 *B3, R3*		4.925 *B3*	4.15 *B3*	6.20 *B3*	3.925 *B3, R3*	5.45 *B3*	6.00 *B3*	6.425 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.										4.325 *A2*		6.20 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$62.00 *B3*	$75.50 *B3*	$82.00 *B3*			4.15 *B3*	6.20 *B3*				
	Morrisville, Pa.													
	New Haven, Conn.											5.95 *A5* 6.20 *D1*		
	Phoenixville, Pa.								4.95 *P2*					
	Sparrows Pt., Md.										3.925 *B3*	5.45 *B3*	6.00 *B3*	6.425 *B3*
	Worcester, Mass.													
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.925 *A7*			
	Canton-Massillon, Dover, Ohio				$75.50 *R3*	$82.00 *R3*								
	Chicago, Ill.			$62.00 *U1*	$75.50 *R3, U1, W8*	$82.00 *U1, W8, R3*		4.925 *U1*	4.10 *U1, W8*	6.175 *U1, Y1*	3.925 *A1, W8*	5.95 *A1*	5.95 *R3*	
	Sterling, Ill.													
	Cleveland, Ohio				$75.50 *R3*							5.45 *A5, J3*		7.80 *J3* 8.15 *A5*
	Detroit, Mich.		$63.00 *R5*		$78.50 *R5*	$85.00 *R5*					4.225 *G3* 4.40 *M2*	5.65 *G3, M2* 5.95 *D1* 6.05 *D2*	6.50 *G3*	7.90 *D2* 8.50 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$62.00 *U1*	$75.50 *U1*	$82.00 *U1, Y1*		4.925 *I3*	4.10 *I3, U1*	6.175 *U1, I3*	3.925 *I3, U1, Y1*	5.70 *I3*	5.95 *U1, I3* 6.45 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Mansfield, Ohio											5.95 *E2*		
	Middletown, Ohio											5.45 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.80 *S1*	5.95 *S1*	7.65 *S1*
	Pittsburgh, Pa. Midland, Pa.	$59.00 *U1*	$62.00 *U1*	$62.00 *U1* $62.50 *J3*	$75.50 *J3 U1*	$82.00 *U1*	3.75 *U1* 3.85 *J3*	4.925 *U1*	4.10 *J3, U1*	6.175 *J3, U1*	4.425 *S7, S9* 3.925 *A7*	5.45 *B4 J3* 6.15 *S7*		7.80 *J3*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								4.35 *W3*		4.025 *W3*	5.45 *F3, W3*	6.30 *W3*	8.30 *W3*
	Youngstown, Ohio					$82.00 *Y1, C10*	3.75 *R3, U1*		4.10 *Y1*	6.675 *Y1*	3.925 *R3, U1, Y1*	5.45 *R3, Y1* 5.95 *C5*	5.95 *U1, R3* 6.45 *Y1*	7.60 *R3* 8.30 *Y1*
WEST	Fontana, Cal.	$86.00 *K1*	$88.00 *K1*	$81.00 *K1*	$94.50 *K1*	$101.00 *K1*			4.75 *K1*	6.825 *K1*	4.70 *K1*	7.35 *K1*	7.05 *K1*	
	Geneva, Utah				$75.50 *C7*				4.10 *C7*	6.175 *C7*				
	Kansas City, Mo.								4.80 *S2*	6.875 *S2*	4.625 *S2*		6.65 *S2*	
	Los Angeles, Torrance, Cal.				$94.50 *B2*	$102.00 *B2*			4.80 *B2, C7*	6.85 *B2*	4.675 *B2, C7*			
	Minnequa, Colo.								4.55 *C6*		4.625 *C6*			
	San Francisco, Niles, Pittsburg, Cal.				$94.50 *B2*				4.75 *B2* 4.91 *P9*	6.80 *B2*	4.675 *B2, C7*			
	Seattle, Wash.				$94.50 *B2, S11*				4.85 *B2*	6.90 *B2*				
SOUTH	Atlanta, Ga.										4.175 *A8*			
	Fairfield, Ala. Alabama City, Ala.			$62.00 *T2*	$75.50 *T2*				4.10 *R3, T2*	6.175 *T2*	3.925 *R3, T2*		5.95 *T2*	
	Houston, Texas				$85.50 *S2*	$92.00 *S2*			4.60 *S2*		4.425 *S2*			

STEEL PRICES

(Effective Sept. 1, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & hvys.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
3.925 *B3*	4.775 *B3*				5.90 *B3*	7.225 *B3*			4.525 *W6*				Buffalo, N. Y.
										† Special coated mfg terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.325 *A2*					6.15 *A2*								Conshohocken, Pa
													Harrisburg, Pa.
													Hartford, Conn.
									4.525 *B3*				Johnstown, Pa.
4.025 *U1*	4.875 *U1*									$8.80 *U1*	$7.50 *U1*	6.60 *U1*	Morrisville, Pa.
													New Haven, Conn.
													Phoenixville, Pa.
3.925 *B3*	4.775 *B3*	5.275 *B3*			5.90 *B3*	7.225 *B3*	8.075 *B3*		4.625 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.825 *A5*				Worcester, Mass.
													Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.925 *A7*		5.275 *A7*	5.175 *A7*										Ashland, Ky.
		5.275 *R3* 5.675 *R1*						5.825 *R1*					Canton-Massillon, Dover, Ohio
3.925 *A1, W8*					5.90 *U1*				4.525 *A5, N4, R3*				Chicago, Ill.
									4.625 *N4*				Sterling, Ill.
3.925 *J3, R3*	4.775 *J3, R3*		5.175 *R3*		5.90 *J3, R3*	7.225 *J3, R3*			4.525 *A5*				Cleveland, Ohio
4.125 *G3*	4.975 *G3*				6.375 *G3*	7.675 *G3*							Detroit, Mich.
													Duluth, Minn.
3.925 *I3, U1, Y1*	4.775 *I3, U1, Y1*	5.275 *U1* 5.325 *I3*	5.175 *I3, U1*	5.675 *U1*	5.90 *U1, I3* 6.40 *Y1*	7.225 *U1* 7.725 *Y1*				$8.70 *I3, U1, Y1*	$7.40 *I3, U1*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.27 *G2*	5.475 *G2*	5.875 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.375 *C9*											Kokomo, Ind.
				6.25 *E2*				5.80 *E2*					Mansfield, Ohio
	4.775 *A7*		5.175 *A7*	5.675 *A7*									Middletown, Ohio
4.225 *S1* 5.425 *N3*	5.80 *N3*		6.775 *N3*	5.45 *S1* 6.00 *N3*	5.90 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
3.925 *J3, U1, P6, A7*	4.775 *J3, U1*	5.275 *U1*	5.175 *U1*		5.90 *J3, U1*	7.225 *J3, U1*	7.925 *U1*		4.525 *A5* 4.725 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa.
									4.725 *P7*				Portsmouth, Ohio
3.925 *W3, W5*	4.775 *W3, W5* 5.775 *F3*	5.275 *W3, W5*		5.675 *W3, W5*	6.175 *W3*	7.475 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.55 *W5* 6.10 *F3*	Weirton, Wheeling, Follansbee, W. Va.
3.925 *R3, U1, Y1*	4.775 *R3, Y1*	5.175 *Y1*			5.90 *U1, R3* 6.40 *Y1*	7.225 *R3* 7.725 *Y1*			4.525 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.70 *K1*	5.875 *K1*				7.00 *K1*	8.275 *K1*			5.325 *K1*				Fontana, Cal.
4.025 *C7*													Geneva, Utah
								4.775 *C6*	4.865 *S2*				Kansas City, Mo.
4.625 *C7*		6.275 *C7*						5.325 *B2*					Los Angeles, Torrance, Cal.
									4.775 *C6*				Minnequa, Colo.
4.625 *C7*	5.725 *C7*	6.025 *C7*							5.175 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.925 *R3, T2*	4.775 *T2*	5.275 *R3, T2*			5.90 *T2*			5.125 *T2* 5.225 *R3*	4.525 *T2, R3*	$8.80 *T2*	$7.50 *T2*		Fairfield, Ala. Alabama City, Ala.
4.425 *S2*									4.925 *S2*				Houston, Texas

STEEL PRICES

(Effective Sept. 1, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's Bright
EAST	Bethlehem, Pa.				4.875 *B3*	6.325 *B3*	6.225 *B3*					
	Buffalo, N. Y.	4.15 *B3,R3*	4.15 *B3,R3*	5.25 *B5*	4.875 *B3,R3*	6.325 *B3* 6.325 *B5*	6.225 *B3*	4.10 *B3*			6.25 *B3*	5.525 *W6*
	Claymont, Del.							4.55 *C4*		5.65 *C4*		
	Coatesville, Pa.							4.35 *L4*		5.75 *L4*		
	Conshohocken, Pa.							4.55 *A2*	5.15 *A2*		6.50 *A2*	
	Harrisburg, Pa.							6.50 *C3*				
	Hartford, Conn.			5.75 *R3*		6.775 *R3*						
	Johnstown, Pa.	4.15 *B3*	4.15 *B3*		4.875 *B3*		6.225 *B3*	4.10 *B3*		5.55 *B3*	6.25 *B3*	5.525 *B3*
	Newark, N. J.			5.65 *W10*		6.65 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.65 *P10*		6.50 *P10*						
	Putnam, Conn.			5.75 *W10*								
	Sparrows Pt., Md.		4.15 *B3*					4.10 *B3*		5.55 *B3*	6.25 *B3*	5.825 *B3*
	Palmer, Worcester, Mansfield, Mass.			5.75 *B5* 6.10 *W11*		6.775 *B5*						5.825 *A5, W6*
	Readville, Mass.			5.75 *C14*								
MIDDLE WEST	Alton, Ill.											
	Ashland, Ky.							4.10 *A7*				
	Canton-Massillon, Ohio	4.15 *R3*		5.20 *R2,R3*	4.875 *R3*	6.325 *R2,R3*						
	Chicago, Ill.	4.15 *R3, U1, N4,W8*	4.15 *R3,N4*	5.20 *A5,W10, W8,B5,L2*	4.875 *U1, W8,R3*	6.325 *A5,W8, W10,L2,R3, B5*		4.10 *U1,W8*	5.15 *U1*	5.55 *U1*	6.25 *U1*	5.525 *A5, R3,N4* 5.625 *W7*
	Cleveland, Ohio	4.15 *R3*	4.15 *R3*	5.20 *A5,C13*		6.325 *A5,C13*		4.10 *J3,R3*	5.15 *J3*		6.25 *J3*	5.525 *A5, R3,C13*
	Detroit, Mich.	4.30 *R5* 4.50 *G3*		5.35 *R5,P8* 5.40 *B5* 5.45 *P3*	5.025 *R5* 5.225 *G3*	6.475 *R5,P8* 6.525 *B5,P3*	6.875 *G3*	4.65 *G3*			7.10 *G3*	
	Duluth, Minn.											5.525 *A5*
	Gary, Ind. Harbor, Crawfordsville, Indiana	4.15 *I3, U1, Y1*	4.15 *I3, U1, Y1*	5.20 *R3*	4.875 *I3, U1, Y1*	6.325 *R3,M5*	6.225 *U1,I3* 6.725 *Y1*	4.10 *I3, U1, Y1*	5.15 *I3*	5.55 *U1*	6.25 *U1,I3* 6.75 *Y1*	5.625 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.625 *C9*
	Sterling, Ill.	4.25 *N4*	4.25 *N4*									5.625 *N4*
	Niles, Ohio Sharon, Pa.							4.10 *S1*		5.70 *S1*	6.25 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.15 *J3, U1*	4.15 *J3, U1*	5.20 *A5, J3, W10,R3,C8*	4.875 *U1,C11*	6.325 *A5, W10,C8*	6.225 *J3, U1*	4.10 *J3, U1*	5.15 *U1*	5.55 *U1*	6.25 *J3, U1*	5.525 *A5, J3,P6*
	Portsmouth, Ohio											5.725 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.40 *W3*				
	Youngstown, Ohio	4.15 *R3, U1, Y1*	4.15 *R3, U1, Y1*	5.20 *Y1,F2*	4.875 *U1,Y1, C10*	6.325 *Y1, C10,F2*	6.225 *U1* 6.725 *Y1*	4.10 *R3, U1, Y1*			6.75 *Y1*	5.525 *Y1*
WEST	Emeryville, Cal.	4.90 *J5*	4.90 *J5*									
	Fontana, Cal.	4.85 *K1*	4.85 *K1*		5.925 *K1*		7.475 *K1*	4.75 *K1*		6.60 *K1*	6.95 *K1*	
	Geneva, Utah							4.10 *C7*			6.25 *C7*	
	Kansas City, Mo.	4.85 *S2*	4.85 *S2*		5.575 *S2*		6.925 *S2*					6.125 *S2*
	Los Angeles, Torrance, Cal.	4.85 *B2,C7*	4.85 *B2,C7*	6.65 *R3*	5.925 *B2*		6.925 *B2*					6.475 *B2*
	Minnequa, Colo.	4.60 *C6*	4.75 *C6*					4.95 *C6*				5.775 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	4.85 *C7,P9* 4.90 *B2*	4.85 *C7,P9* 4.90 *B2*				6.975 *B2*					6.475 *C7*
	Seattle, Wash.	4.90 *B2,N6*	4.90 *B2,S11*				6.975 *B2*	5.00 *B2*			7.15 *B2*	
SOUTH	Atlanta, Ga.	4.40 *A8*	4.40 *A8*									5.775 *A8*
	Fairfield, Ala. Alabama City, Ala.	4.15 *R3,T2*	4.15 *R3,T2*				6.225 *T2*	4.10 *R3,T2*			6.25 *T2*	5.525 *R3, T2*
	Houston, Texas Ft. Worth, Texas	4.65 *S2*	4.65 *S2*		5.375 *S2*			4.60 *S2*				5.925 *S2*

Steel Prices

(Effective Sept. 1, 1953)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mill, Seattle

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0	.....		.....		.....		.....	
Youngstown *R3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....		.....		.....		.....	
Fontana *K1*	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0	.....		.....		.....		.....	
Pittsburgh *J3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Alton, Ill. *L1*	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	
Sharon *M3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....		.....		.....		.....	
Pittsburgh *N1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Wheeling *W5*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....		.....		.....		.....	
Wheatland *W4*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....		.....		.....		.....	
Youngstown *Y1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Indiana Harbor *Y1*	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0	.....		.....		.....		.....	
Lorain *N2*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0	.....		.....		.....		.....	
Youngstown *R3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....		.....		.....		.....	
Fontana *K1*	16.75	.....	20.75	.....	22.75	.....	23.25	.....	23.75	.....	24.25	.....	24.75	.....	.....		.....		.....		.....	
Pittsburgh *J3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Alton, Ill. *L1*	.....		.....		.....		.....		.....		.....		.....		.....		.....		.....		.....	
Sharon *M3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....		.....		.....		.....	
Pittsburgh *N1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Wheeling *W5*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....		.....		.....		.....	
Wheatland *W4*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....		.....		.....		.....	
Youngstown *Y1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Indiana Harbor *Y1*	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0	.....		.....		.....		.....	
Lorain *N2*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., 1½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 2¼ pts. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 4½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 11.0¢.

Steel Prices

(Effective Sept. 1, 1953)

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*32.7	
Washington, Pa. *J2*	.....	
Claymont, Del. *C4*	.....	
New Castle, Ind. *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa. *L4*	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa. *L4*	46.10	
Monel-carbon		
10 pct. Coatesville, Pa. *L4*	38.90	
Aluminized steel sheets, hot dip, Butler, Pa., *A7*		.....

* Includes annealing and pickling, sandblasting.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago $110.30 to $113.80
6 to 24-in., del'd N.Y. 113.50 to 114.50
6 to 24-in., Birmingham 96.50 to 101.00
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less .....$128.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	8.35	9.60	10.40	10.95	11.50	12.20
Brackenridge *A3*	....	8.35	9.60	10.40	10.95	.....	12.20
Granite City *G2*	....	8.55	9.80	.....	.....	.....	.....
Ind. Harbor *I3*	7.85	8.35	9.60	.....	.....	.....	.....
Mansfield *E2*	7.85	8.35	9.60	10.40	.....	.....	.....
Newport, Ky. *N5*	7.85	8.35	9.60	10.40	10.95	.....	.....
Niles, O. *N3*	7.85	8.35	.....	.....	.....	.....	.....
Vandergrift *U1*	7.85	8.35	9.60	10.40	10.95	11.50	12.20
Warren, O. *R3*	7.85	8.35	9.60	.....	.....	.....	.....
Zanesville *A7*	7.85	8.35	9.60	10.40	10.95	11.50	12.20

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.66
18	4	1	—	5	2.34
18	4	2	—	—	1.82
1.5	4	1.5	8	—	.895
6	4	2	6	—	1.065

High-carbon chromium ..... .70
Oil hardened manganese ..... .39
Special carbon ..... .355
Extra carbon ..... .30
Regular carbon ..... .25

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Twisted Barbless Wire	Galv. Barbed Wire	Merch. Wire Annld	Merch. Wire* Galv.
	Col	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	131	140		149		153	6.675	7.075
Aliquippa, Pa. *J3*	131	143				150	6.675	7.20
Atlanta *A8*	134	146		152		159	6.925	7.475
Bartonville *K2*	131	143				156		
Buffalo *W6*								
Chicago, Ill. *N4*	131	143		149	156	156	6.675	7.225
Cleveland *A6*	137							
Cleveland *A5*							6.675	
Crawfrdsvl. *M4*	133	145		151		153	6.775	7.325
Donora, Pa. *A5*	131	140		149		153	6.675	7.075
Duluth *A5*	131	140	145	149		153	6.675	7.075
Fairfield, Ala. *T2*	131	140		149		153	6.675	7.075
Galveston *D4*	139	148						
Houston *S2*	139	151				164	7.075	7.625
Johnstn., Pa., *B3*	131	143	145		156	156	6.675	7.225
Joliet, Ill., *A5*	131	140		149		153	6.675	7.075
Kokomo, Ind. *C9*	133	142		151		155	6.775	7.175
Los Angeles *B2*							7.625	
Kansas City *S2*	143	155		161		168	7.275	7.825
Minnequa *C6*	136		145	154	162	162	6.925	7.325
Monessen *P6*	131	145				157	6.675	7.225
Moline, Ill. *R3*			145					
Pittsburg, Cal. *C7*	150	163		173	173	173	7.625	8.025
Portsmouth *P7*	132						6.675	
Rankin, Pa. *A5*	131	140				153	6.675	7.075
So. Chicago *R3*	131	140	145	149		153	6.675	7.075
S. San Fran. *C6*						173		
Sparrows Pt. *B3*	133			151	158	158	6.775	7.325
Struthers, O. *Y1*							6.675	7.175
Worcester *A5*	137						6.975	
Williamsport, Pa. *S10*	133		158					

* Cut Nails, carloads, base $8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As Rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.20	7.64	7.81[3]	7.00	.....	6.85	6.98	6.86	8.17	.....	.....	.....	.....
Birmingham	.15	6.10	7.00	8.00[4]	6.30	.....	6.35	6.35	6.15	8.75	.....	.....	.....	.....
Boston	.20	6.89	7.83	9.23	7.13	9.23–9.35[2]	7.13	7.06	6.87	8.35	12.40	12.25–12.28	.....	14.75–14.78
Buffalo	.20	6.18–6.20	7.15	9.00–9.01	6.65–6.79	.....	6.65–6.68	6.55–6.59	6.35–6.65	7.70	.....	12.17–15.35	14.45	14.55
Chicago	.20	6.18	7.12	8.0.	6.42	.....	6.33–6.38	6.46	6.28	7.30	.....	11.75	.....	14.25
Cincinnati	.20	6.46	7.14	8.42	6.67	.....	6.80	6.88	6.53	7.61	.....	12.12	.....	14.82
Cleveland	.20	6.18	7.12	7.90	6.5[5]	.....	6.50	6.79	6.34	7.65	.....	11.89	.....	14.39
Denver		7.95	8.85	10.10	8.20	9.55	7.95	7.95	8.05	9.05	.....	.....	.....	15.25–15.75
Detroit	.20	6.35–6.45	7.25–7.32	8.34	6.30–7.31	7.36–8.35	6.53–6.85	6.93	6.56–6.57	7.60–7.69	12.27	12.12	14.52	13.44–14.62
Houston	.20	7.15	7.85	.....	7.45	.....	7.20	7.35	7.45	9.85	.....	12.95	.....	.....
Kansas City	.20	6.85	7.79	8.72	7.09	.....	7.05	7.13	6.95	8.08	.....	.....	.....	.....
Los Angeles	.20	7.25	9.00	9.60	7.55	10.75–11.30	7.20	7.35	7.15–7.25	9.10–9.75	13.40–13.55	13.05	15.75	15.85–16.05
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	7.89	.....	.....	.....	.....
Milwaukee	.20	6.35	7.29	8.22	6.59	.....	6.50–6.55	6.63	6.45	7.57	.....	11.92	.....	14.42
New Orleans	.15	6.51–6.66	7.56	8.25	6.63–6.78	.....	6.73–6.88	6.81–6.96	6.60–6.75	8.42–8.57	.....	.....	.....	.....
New York	.30	6.78	7.75	9.02	7.16	9.05	6.99	6.90	7.06	8.53–8.43[5]	11.99–12.29	10.39–12.14	14.04–14.54	12.64–14.64
Norfolk	.20	6.90	.....	.....	7.20	.....	7.15	7.20	7.20	8.50	.....	.....	.....	.....
Philadelphia	.25	6.53	7.55–8.25	8.35	7.02	.....	6.83	6.67	6.87	8.24	12.04	11.89	14.29	14.39
Pittsburgh	.20	5.95–6.18	6.82	8.30–8.60	6.20–6.55	.....	6.03–6.33	6.07–6.46	5.98–6.28	7.65	.....	11.45–11.75	.....	13.75–14.25
Portland	.10	8.00	9.80	9.95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salt Lake City	.20	9.05	10.80	10.65	9.35	.....	8.70	8.85	9.20	11.25	.....	.....	.....	.....
San Francisco	.15	7.35	8.70	9.90–10.15	7.60	10.35	7.20	7.25	7.15	9.75–9.85	13.55	12.80–13.05	15.50	15.55–16.05
Seattle	.20	8.15	8.70	9.95–10.10	8.02	.....	7.59	7.50	7.58	10.13	.....	13.40	.....	16.00
St. Louis	.20	6.48	7.42	8.35	6.72	.....	6.73	6.86	6.58	7.70	12.20	12.05	14.45	14.30–14.55
St. Paul	.15	6.84	7.78	8.71	7.08	.....	6.99	7.12	6.94	8.06	.....	12.19	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (3)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over.

C-R SPRING STEEL

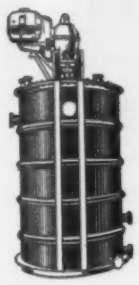
Cents Per Lb. F.o.b. Mill	CARBON CONTENT: 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7**	6.15	8.00	8.60	10.55	12.15
Carnegie, Pa. *S9*	.....	8.00	8.60	10.55	12.15
Cleveland *A5*	5.45	7.65	8.20	10.55	12.15
Detroit *D2*	6.05	8.25	8.85	.....	.....
Harrison, N. J. *C11*	.....	.....	8.90	10.85	13.15
New Castle, Pa. *B4*	5.80	8.00	8.60	.....	.....
New Haven, Conn. *D1*	6.70	7.95	8.55	10.50	.....
Sharon, Pa. *S1*	5.80	8.00	8.60	10.55	12.15
Trenton *R4*	.....	7.95	8.55	10.50	12.10
Weirton, W. Va. *W3*	5.80	8.00	8.60	10.55	12.15
Worcester, Mass. *A5*	5.75	7.95	8.90	10.85	13.15
Youngstown *C5*	.....	8.05	8.60	10.55	12.15

* Sold on Pittsburgh base.

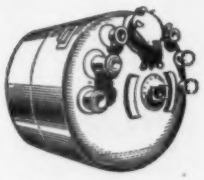
BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size: OD-In.	Size: B.W. Ga.	Seamless: H.R.	Seamless: C.D	Elec. Weld: H.R.	Elec. Weld: C.D.
Babcock & Wilcox	2	13	30.08	36.28	26.51	31.98
	2½	12	40.51	48.86	35.70	43.07
	3	12	45.92	55.39	.....	49.73
	3½	11	53.60	64.65	48.13	58.06
	4	10	65.91	79.50	63.92	77.10
National Tube	2	13	.....	32.98	24.88	.....
	2½	12	36.82	44.41	33.50	.....
	3	12	42.52	51.28	38.69	.....
	3½	11	49.63	59.87	45.16	.....
	4	10	65.91	79.50	59.97	.....
Pittsburgh Steel	2	13	27.34	32.98	.....	.....
	2½	12	36.82	44.41	.....	.....
	3	12	42.52	51.28	.....	.....
	3½	11	49.63	59.87	.....	.....
	4	10	65.91	79.50	.....	.....

HAYNES Alloy Sheet and Plate
Trade-Mark

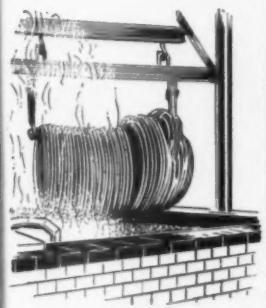


Evaporators



Autoclaves

Agitators



Pickling Equipment

For SEVERE SERVICE conditions

You can obtain sheet and plate of four different HAYNES alloys, all specially designed to combat certain severe service conditions, for the fabrication of processing equipment. The alloys are all strong and highly resistant to heat, oxidation, and chemical corrosion. The chart below will give you an idea of where each is most commonly used.

HAYNES alloy sheet and plate have been used successfully for many different types of fabricated equipment. Typical applications include reaction vessels, condensers, autoclaves, heat exchangers, evaporators, dryers, mixers, agitators, fans, and blowers. The alloys can be fabricated by deep drawing, spinning, pressing, forming, and welding.

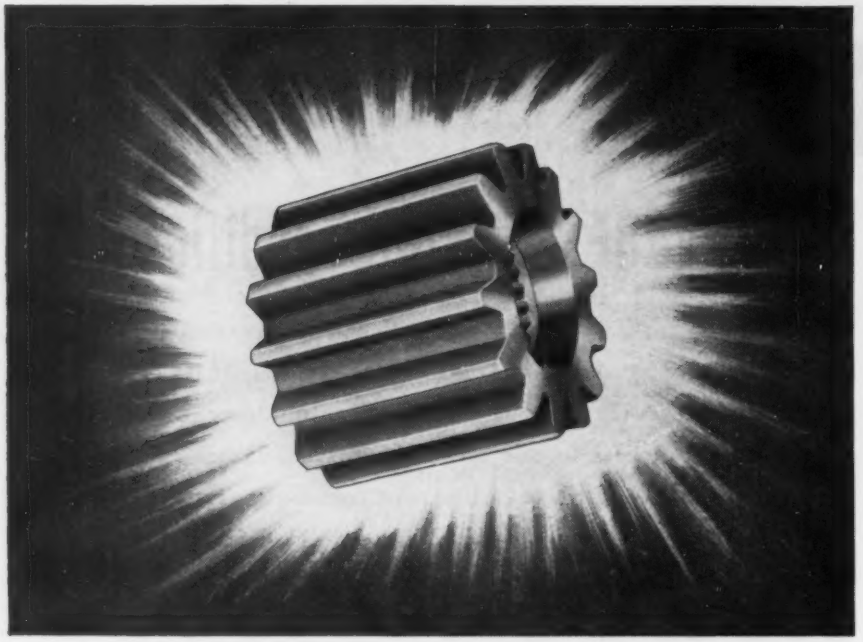
All four HAYNES alloys are supplied in hot-rolled sheet and plate in thicknesses of 1 in. down to 24 U. S. Std. (0.025 in.). These materials are furnished annealed and pickled with a commercial No. 1 finish. If you wish further information about HAYNES alloy sheet and plate, contact the nearest Haynes Stellite Company district office.

USE SHEET OR PLATE OF	FOR RESISTANCE TO
HASTELLOY Alloy B (nickel-molybdenum-iron)	Hydrochloric acid, wet hydrogen chloride gas, sulphuric acid, phosphoric acid, organic acids, high temperatures.
HASTELLOY Alloy C (nickel-molybdenum-chromium-iron)	Nitric acid, free chlorine, acid salts, hydrochloric acid, sulphuric acid, phosphoric acid, organic acids, sulphurous acid, high temperatures.
MULTIMET Alloy (cobalt-chromium-nickel-iron)	Oxidation, high temperatures.
HAYNES Alloy No. 25 (cobalt-chromium-tungsten-nickel)	Oxidation, high temperatures, carburization, wet chlorine, nitric acid.

HAYNES TRADE-MARK *alloys*

"Haynes," "Hastelloy," and "Multimet" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa



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—Miscellaneous Prices—

(Effective Sept. 1, 1953)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.325	5.20	5.275				*
Chicago *R3*				7.05			
Cleveland *R3*							
Ensley *T2*	4.325	5.20					
Fairfield *T2*		5.20					
Gary *U1*	4.325	5.20				5.125	
Ind. Harbor *I3*	4.325		5.275	7.05		5.125	
Johnstown *B3*		5.20					
Joliet *U1*		5.20	5.275				
Kansas City *S2*				7.30			11.00
Lackawanna *B3*	4.325	5.20	5.275			5.125	
Lebanon *B3*				7.05	10.50		11.00
Minnequa *C6*	4.325	5.70		7.05	11.55		10.35
Pittsburgh *O1*					10.50		11.00
Pittsburgh *P5*					10.50		11.00
Pittsburgh *J3*				7.05			
Pitt'g, Cal. *C7*						5.275	
Seattle *B2*				7.55		5.275	11.50
Steelton *B3*	4.325		5.275			5.125	
Struthers *Y1*							
Torrance *C7*						5.275	
Youngstown *R3*				7.05			

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953 to end of season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	

Prices based on upper Lake rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.00
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.65
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	22.95
Swedeland, Pa., f.o.b.	22.65
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	28.75
St. Louis, f.o.b.	26.00
Birmingham, del'd	23.21
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant threaded electrodes with nipples, unbosed

Diam. in In.	Length in in.	Cents Per lb.
	GRAPHITE	
24	84	39.50
18, 20	72	39.50
12, 14	72	41.00
7 to 10	60	43.25
6	60	46.00
4	40	47.50
3	40	49.00
2½	30	42.50
2	24	
	CARBON	
40	100, 110	8.55
35	110	8.55
30	110	9.20
24	72 to 84	8.55
20	90	9.20
17	72	8.50
14	72	10.30
10, 12	60	10.55
8	60	

"TRICLENE" D

(TRICHLORETHYLENE)

—the modern degreasing solvent

Made by Du Pont • Pioneer Manufacturer of Degreasing Fluids

Ever since Du Pont chemists first developed synthetic solvents for vapor degreasing, they have worked to provide industry with the best possible product. Today's "Triclene" D is just that—the most effective degreasing solvent Du Pont has ever produced. This rugged solvent incorporates *all* the advantages of over 20 years' technical and practical experience.

"Triclene" D is now successfully used in thousands of plants. It thoroughly removes most of the stubborn buffing compounds, greases and lubricating oils . . . assures excellent results even in high-speed operations. And with "Triclene" D goes expert technical assistance from Du Pont and your local distributor. For this friendly service, simply write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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Please send me the literature checked below:

- ☐ "How trichlorethylene is used in metal cleaning".
- ☐ "Triclene" D — an improved vapor degreasing solvent.
- ☐ "Metal degreasing — standard practices."
- ☐ Du Pont publication, "MODERN METAL FINISHING". (Please add my name to the mailing list).

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1—ONLY READY-POWER CAN BE QUICKLY CHANGED. A spare can be installed in 5 minutes!

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Remember . . . your truck is no better than its power. It PAYS to convert present electric trucks to Ready-Power . . . and it PAYS to specify Ready-Power when buying new trucks.

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The READY-POWER Co.

3822 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

—Miscellaneous Prices—

(Effective Sept. 1, 1953)

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg Reg.	K.	Less Keg Hvy.	K.
⅛ in. & smaller	+2	15	+2	18
9/16 in. & ⅝ in.	+7	11	+33*	+10*
¾ in. to 1½ in. inclusive	+3	10	+27**	+6**
1⅝ in. & larger	+9	9	+27	+6

* 9/16 to ¾ in.
** ⅞ to 1½ in.

Nuts, Hot Pressed—Hexagon

⅛ in. & smaller	11	26	8	33
9/16 in. & ⅝ in.	2	18	+30	net
¾ in. to 1½ in. inclusive	+6	12	+35	+4
1⅝ in. & larger	+8	10	+26	+4

Nuts, Cold Punched—Hexagon

⅛ in. & smaller	11	26	8	33
9/16 in. & ⅝ in.	9	24	+2	15
¾ in. to 1½ in. inclusive	+1	16	+9	9
1⅝ in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

⅛ in. & smaller	23	36	14	28
9/16 in. & ⅝ in.	18	32	4	20
¾ in. to 1½ in. inclusive	8	23	+8	10
1⅝ in. & larger	+14	5	+20	net
	Light			
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished 44½—10
Packaged, plain finish 25½—10
Bulk, plain finish** 50*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets — *Base per 100 lb*

½ in. & larger $11.90

Pct Off List

7/16 in. and smaller 30

Cap and Set Screws
(In bulk) — *Pct Off List*

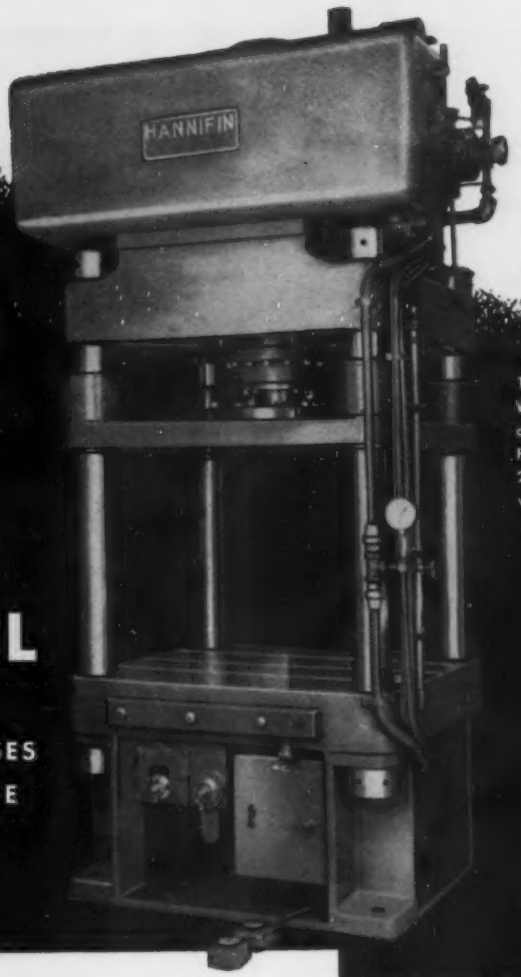
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020 bright 40
¾ in. thru 1 in. up to & including 6 in. 30
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat 40
¾ in. thru 1 in. up to & including 6 in. 33
Milled studs 17
Flat head cap screws, listed sizes 13
Fillister head cap, listed sizes 7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter 27

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	4	20
9/16 in. & ⅝ in. x 6 in. & shorter	5	21
¾ in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in.	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	...

IT'S ALL A MATTER OF CONTROL

HANNIFIN HYDRAULIC PRESSES CAN BE EQUIPPED WITH THE *CONTROLS YOU NEED*



150-TON FOUR-COLUMN PRESS—Semi-automatic cycle. Advance at high speed, feed stroke starting at pre-set point in stroke and automatic reversal. Self-contained unit with reservoir, hydraulic pumps and control valves on top of press. Dual electric push buttons.

15-TON FORCING PRESS—With built-in hydraulic power unit and exclusive, patented Sensitive Pressure Control. Gap, 22″; stroke, 21″; reach, 10″; table, 19″ x 22″ with U slot.

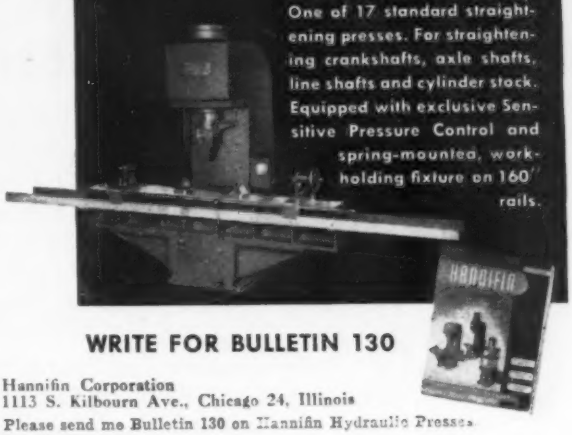
When you select a hydraulic press to do a certain job—*it's the control that's all-important.* Here Hannifin excels . . . for Hannifin Hydraulic Presses are supplied with many types of control.

One outstanding Hannifin development is patented Sensitive Pressure Control . . . standard equipment on Hannifin straightening and forcing presses. But Hannifin also offers conventional manual control, adjustable for maximum pressure, and a wide range of electric push button controls. Rapid advance followed by slow feed stroke, automatic reversal on time, pre-set pressure, or distance, all are available when needed. Ram speed control can be supplied as an optional extra feature with any of these controls, and cycling can be automatic or semi-automatic.

Chances are you can select the right press, and the type of control you need, directly from Hannifin's catalog . . . it lists more than 75 models, capacities from 1 ton to 150 tons. However, if your requirements are special, a Hannifin Field Engineer will analyze them, then recommend the exact control, or combination of controls, to do the job. Why not consult with him? Hannifin Corporation, 1113 S. Kilbourn Ave., Chicago 24, Ill.

HANNIFIN'S NEW HYDRAULIC "HAN-D-PRESS"—For small part assembly operations. Available in 1-ton and 2-ton sizes with pressure adjustable. Stroke, 6″; reach, 6″; gap, 10″. Speeds: (1 ton) 400 ipm, advance; 800 ipm, return. Dual manual controls standard.

35-TON OPEN GAP STRAIGHTENING PRESS—One of 17 standard straightening presses. For straightening crankshafts, axle shafts, line shafts and cylinder stock. Equipped with exclusive Sensitive Pressure Control and spring-mounted, work-holding fixture on 160″ rails.



WRITE FOR BULLETIN 130

Hannifin Corporation
1113 S. Kilbourn Ave., Chicago 24, Illinois
Please send me Bulletin 130 on Hannifin Hydraulic Presses.

Name.....

Title.....

Company.....

Address.....

City.....*State*.....

Hannifin Representatives Are at Your Service in These Leading Industrial Centers

Atlanta, Buffalo, Cincinnati, Cleveland, Dallas, Dayton, Denver, Detroit, Houston, Los Angeles, Milwaukee, Minneapolis, Moline, New Orleans, New York, Philadelphia, Pittsburgh, Richmond, Va.; Rochester, N. Y.; St. Louis, Seattle, South Bend, Ind.; Washington, D. C.; or Worcester, Mass. In Canada, TEM Sales Company, Ltd., Toronto and Windsor.

HANNIFIN

Hydraulic Presses • Pneumatic Presses • Hydraulic Riveters
Hydraulic Cylinders • Air Cylinders • Air Control Valves

THIS PICTURE TELLS A STORY of a new cost-cutting opportunity for steel mills

Note the ready accessibility of each item of steel in this storage yard of a well-known steel mill. It's this availability of materials that's one of the prime advantages of the ROSS STRADDLE CARRIER handling method . . an advantage, unmatched by any other method, that eliminates delays, lowers costs and increases the production efficiency of the mill.

ROSS STRADDLE CARRIERS, heart of the Ross unit-load handling system, are built to handle 45,000-pound concentrated loads on around-the-clock schedules in the roughest, toughest steel mill service . . . to put those loads *where* wanted *when* wanted.

Your mill, too, can profit by this modern, flexible mass handling system. Get in touch with Ross today for the complete details.

Rely On ROSS

ROSS CARRIER LINE
Industrial Truck Division
CLARK EQUIPMENT COMPANY
BENTON HARBOR 51, MICHIGAN

—Miscellaneous Prices—

(Effective Sept. 1, 1953)

REFRACTORIES

Fire Clay Brick — *Carloads, per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.25)	$99.30
No. 1 Ohio	92.40
Sec. quality, Pa., Md., Ky., Mo., Ill.	92.40
No. 2 Ohio	83.16
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.60)	14.40

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$99.30
Childs, Pa.	102.95
Hays, Pa.	105.10
Chicago District	122.40
Western Utah	116.55
California	122.85
Super Duty, Hays, Pa., Athens, Tex., Chicago	110.65
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	17.30
Silica cement, net ton, bulk, Hays, Pa.	19.60
Silica cement, net ton, bulk, Ensley, Ala.	18.45
Silica cement, net ton, bulk, Chicago District	18.45
Silica cement, net ton, bulk, Utah and Calif.	25.95

Chrome Brick — *Per net ton*

Standard chemically bonded Balt., Chester	$86.00
Burned, Balt., Chester	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite — *St. ¾-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., in bulk	38.00
in sacks	43.70

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $14.50

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.

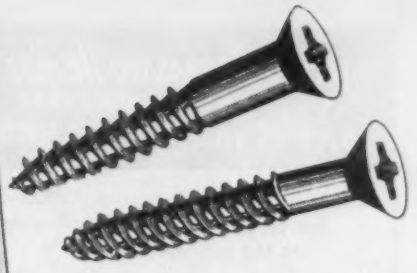
Price, net ton; Effective CaF_2 content	
72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron, c.l.f. New York, ocean bags	11.25¢
Canadian sponge iron, del'd. in East	12.0¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	53.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 mieron, 98%, 99.8+% Fe	83.0¢ to $1.41
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50 21.75¢
Lead	17.0¢
Manganese	$2.75
Molybdenum, 99%	88.0¢
Nickel, unannealed	95.0¢
Nickel, annealed	92.0¢
Nickel, spherical, unannealed	93.5¢
Silicon	$3.90
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	$1.10
Stainless steel, 316	$1.35
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$5.35
Zinc, 10 ton lots	23.0¢ to 30.5¢

Personal
Memo to
The Purchasing Agents and Engineers of Industry—
May we be of help to you?
We are at your service
from
AMERICAN SCREW COMPANY
Makers of
AMERICAN PHILLIPS Screws



American PHILLIPS Wood Screws with sharp gimlet points, sharp threads, well-formed heads.

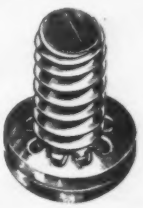
American PHILLIPS "TWINfast" Wood Screws with twin threads for greater driving speed.

American PHILLIPS Machine Screws for fastest driving in drilled or tapped holes (or with nuts).

American PHILLIPS Type 25 Thread-Cutting Screws, for metals.

American PHILLIPS Type 1 Thread-Cutting Screw taps its own thread in metal *as it's driven.*

Above and below are shown American PHILLIPS Sems* Assemblies, preassembled lock washers and screws save assembly time.



*(U. S. PATENTS NO. 2,113,424 AND 2,113,425.)

American PHILLIPS Type B Tapping Screws, for assembling heavy sheet metal.

American PHILLIPS Type A Tapping Screws, for faster fastening of light-gage sheet metal.

AMERICAN SCREW COMPANY
PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT
Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.

HOW KRANE KAR SWING-BOOM CRANE SAVES M-H* DOLLARS

A MACHINERY MFR. reports, "KRANE KAR has cut our Materials-Handling costs on the average about 75%."

A FORGING PRODUCER writes, "Up to a quarter-million pounds of steel moved in an 8-hour day."

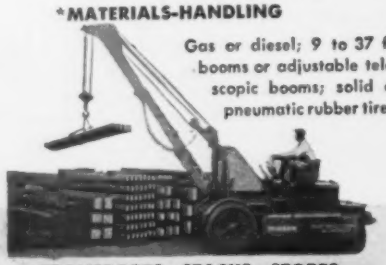
"KRANE KAR," a BALL BEARING MFR. says, "unloaded 50 tons of tubing from a box-car and transferred same to truck in 3 hours."

Another MANUFACTURER: "Simplified our materials-handling . . . *saved us $3824.24 in 8 months.*"

ADDITIONAL CASE HISTORIES IN ILLUSTRATED BUL. #89

*MATERIALS-HANDLING

Gas or diesel; 9 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires.



TRANSPORTS, STACKS, STORES

LOADS, UNLOADS CARRIERS

WORKS ON PRODUCTION LINE, MAINTENANCE AND REPAIRS

MOVES SCRAP, WASTE MATERIAL

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

McDANEL HIGH TEMPERATURE PORCELAIN COMBUSTION TUBES

for Carbon and Sulphur Determinations

OTHER McDANEL PRODUCTS

- Self-cooling Combustion Tubes.
- High Temperature Combustion Tubes.
- Refractory Porcelain Specialties in stock or designed to meet specific needs.

Specify McDanel High Temperature Combustion Tubes from your supplier.

Because of their superior performance McDanel high temperature combustion tubes are preferred by metallurgical laboratories from coast to coast. McDanel Tubes are laboratory controlled from the mixing of the batch to the grinding for stopper tightness. Proper density, accurate bore size, wall thickness, etc. must be right before tubes are passed for shipment. That is why McDanel Tubes serve better and last longer and that is why McDanel Tubes are so generally preferred.

Straight, tapered, or double reduced self-cooling ends.

McDanel Refractory Porcelain Co.
Beaver Falls . . . Penna.

Ferroalloy Prices

(Effective Sept. 1, 1953)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered. 65-72% Cr, 2% max. Si.

0.025% C	34.50	0.20% C	33.50
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75
65-69% Cr, 4-9% C			24.75
62-66% Cr, 4-6% C, 6-9% Si			25.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.18
0.50% max. C	1.14
9 to 11% C	1.11

Low Carbon Ferrochrome Silicon

(Or 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, bulk 2-in. x down, 25.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 25.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.50
Less ton lots	23.50

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.50

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

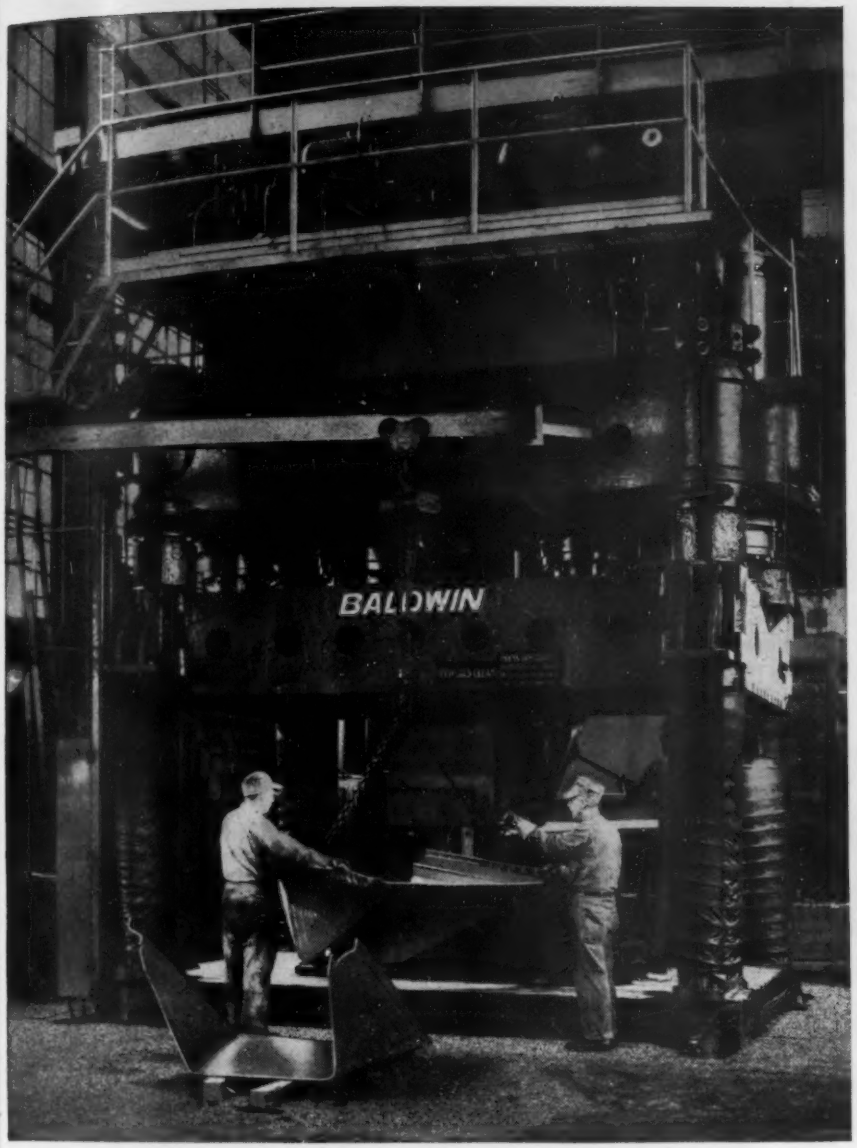
Maximum contract base price, f.o.b. lump size:

Producing Point	Base Mn Content	Cents per lb (Contained Mn)
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	76-80%	12.15 (Per lb of alloy)
Clairton, Pa.	74-76%	10.00
Johnstown, Pa.	74-76%	10.00
Sheridan, Pa.	74-76%	10.00

Add or subtract 0.1¢ for each 1% Mn above or below base content.

Briquets—delivered, 66 pct Mn.

Carloads, bulk	12.50
Ton lots, packed	14.00

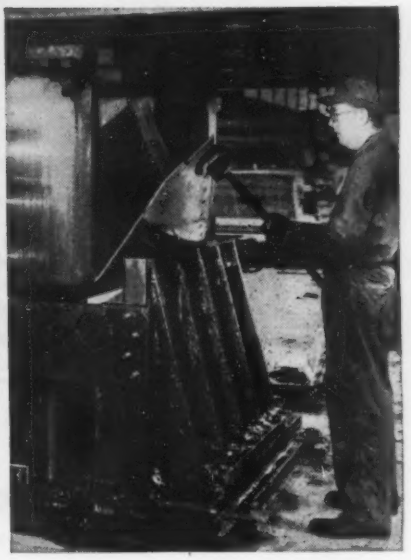


THE PRESSING PROBLEM:

In order to press hopper chutes in one operation, Despatch Shops, Inc., East Rochester, N.Y., needed a rugged press with at least 72 inches of daylight.

THE BALDWIN SOLUTION:

This 1,500 ton Baldwin hydraulic press (at left) not only provides 80 inches of daylight but also has exceptional strength and power.



DESPATCH SHOPS, INC., REPORTS:

"Our rugged Baldwin press, *with 80 in. of daylight,* enables us to press hopper chutes in one operation"

What's your pressing problem?

Baldwin-Lima-Hamilton's unsurpassed experience and facilities are ready to help you solve *your* pressing problem. For further facts about B-L-H presses for metalworking, please write Dept. 4416, Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

Producing hopper car chutes, side stakes, freight car ends and roofs used in the manufacturing of refrigerator and hopper cars, this Baldwin press benefits Despatch three ways:

1. Since its design allows a full 80 inches of daylight, this Baldwin press permits ready handling of very deep shapes such as the hopper chutes being formed in the above photographs.
2. The ease with which this press can be controlled is extremely advantageous because it is necessary for the operator to be able to maintain very accurate control of pressure on the parts being formed.
3. The exceptional strength and power of the Baldwin press is evident particularly in the platens and platen guides. This ruggedness of design helps account for the fact that maintenance costs for the B-L-H press have been negligible.

BALDWIN-LIMA-HAMILTON

Philadelphia 42, Pa. • Offices in Principal Cities

a *Balanced* BARROW for Forward-End Dumping!

★ *REINFORCED* FOR HEAVY-DUTY SERVICE!

This Sterling Wheelbarrow has a reinforced tubular steel frame with special steel nose shoe. Provides perfect balance for forward end dumping and extra strength for heavy duty service. Rugged construction includes V-shaped tray braces and 12-spoked steel wheel. Ideal for wheeling sand, scrap, castings, coal and other heavy bulk materials. Can be furnished with pneumatic or zero pressure wheel. Prompt shipment.

Write for literature.

Sterling FOUNDRY EQUIPMENT

STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

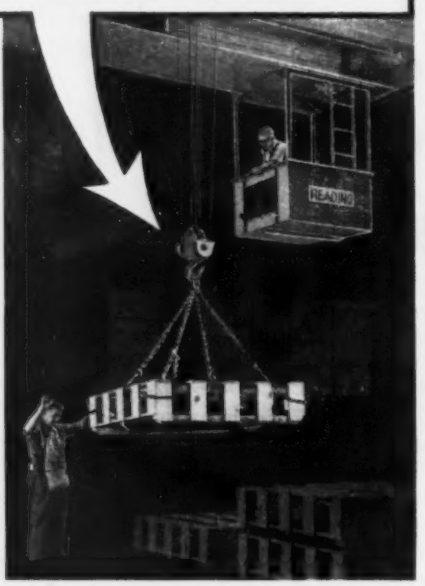
A 5377-54

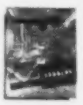
They picked a "READING" CRANE to shorten their load handling cycle ...

When this well-known stove manufacturer wanted to speed up assembly, he put his problem to "Reading" engineers. Installation of a 10-ton, double I-beam, cab-controlled "Reading" crane brought even greater results than expected. There are good reasons.

All "Reading" electric cranes — cab or floor controlled— are "job tailored". There is no extra cost for this special engineering service. Actually, costs go *down*, because motor, trolleys, brakes and hoisting units are assembled into a crane that fits your needs exactly.

You get greater operating efficiency. More accurate spotting is possible. Precise speed control is assured. Moreover, maintenance costs are minimized because each unit can be removed and serviced individually without dismantling entire crane. Get complete information by writing for our latest 16-page bulletin, "The *Why* and *How* of Faster Production".





Chain Hoists
Electric Hoists
Overhead
Traveling
Cranes

READING CRANE & HOIST CORP. • 2101 ADAMS STREET, READING, PA.

READING CRANES

—Ferroalloy Prices—

(Effective Sept. 1, 1953)

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	31.50
Ton lots	33.50
Less ton lots	35.50
Premium for hydrogen-removed metal	1.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered. 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.10	85% Si	15.55
65% Si	13.60	90.95% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

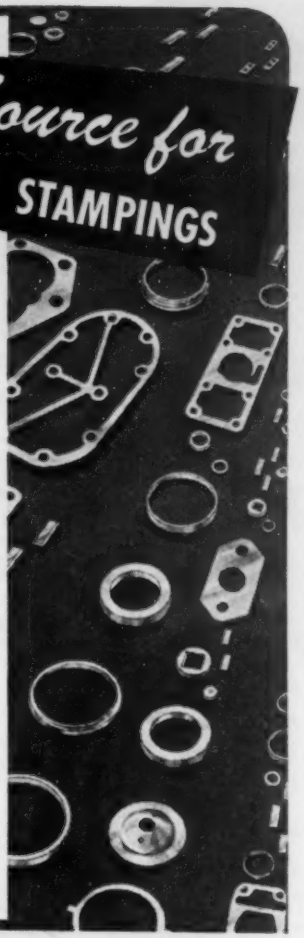
	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Your Source for NON-FERROUS STAMPINGS

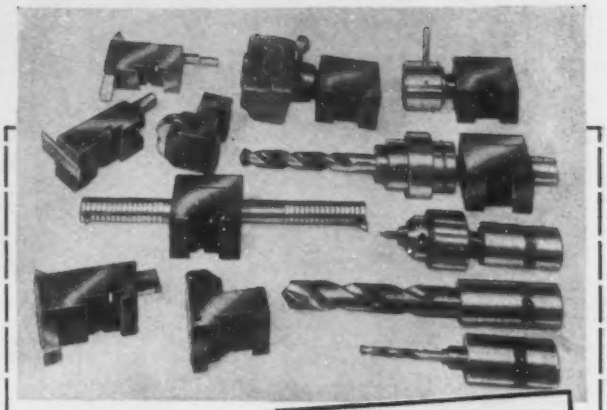


Important small parts—small precision stampings, washers, gaskets, spacers, shims, plugs, sealing rings, etc.—made from copper, bronze, brass, lead, tin or other non-ferrous metals.

Lead Alloy Products Company has specialized in such items for many years—has thousands of dies and large material inventory. We're geared to produce quickly. Often we can start production within hours after receipt of your order.

Phone if You Are in a Hurry

LEAD ALLOY PRODUCTS CO.
9112 ROSELAWN AVE.
DETROIT 4, MICHIGAN



truly versatile...

KDK BAR ADAPTABILITY

This photograph shows how the "truly versatile" K D K Tool Holder Bars can be used. Standard set of bars with Box Tool Die head and Quick Change chuck with adapters are being used in Master Bar.

Five bars will hold nine tools and permit 24 combinations thus saving set-up time.

The quick change of bars has increased production up to 400%.

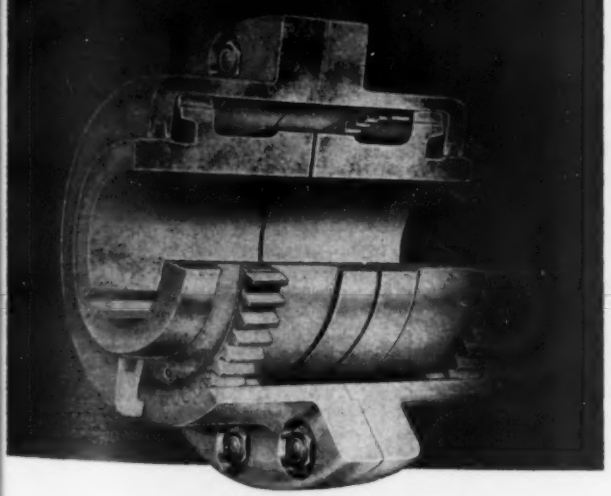
Stocking Jobbers:
KDK Sales
303 Maple Blvd.,
Monroe, Michigan

Wm. O. M. Jones
942 Madison St.,
Oak Park, Illinois

KDK PRODUCTS
Manufactured by L. W. (JACK) KUHN

10601 Otis Street, South Gate, California
LOrain 6-4754

POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

Lithographers National Association Awards

MEYERCORD DECALS FIRST PLACE AGAIN IN 1953!

Produced for Stork-line Furniture Corp. —Fawn and Bear crib decoration in third dimensional technique.

1st 1953

For the second straight year the decal industry has been invited to compete in the Lithographers National Association Awards . . . and for the second straight year we proudly acknowledge the winning of FIRST PLACE in this competition by The Meyercord Co.

It is important to you to know that The Meyercord Co. has been honored by expert judges recruited from top levels of the graphic arts. When you bring your decal transfer problem to Meyercord you are *sure* you will receive the counsel of carefully trained and experienced people . . . backed by the finest and most complete laboratory and production facilities available. Count on Meyercord for the *right* decal for *every* commercial surface and finish.

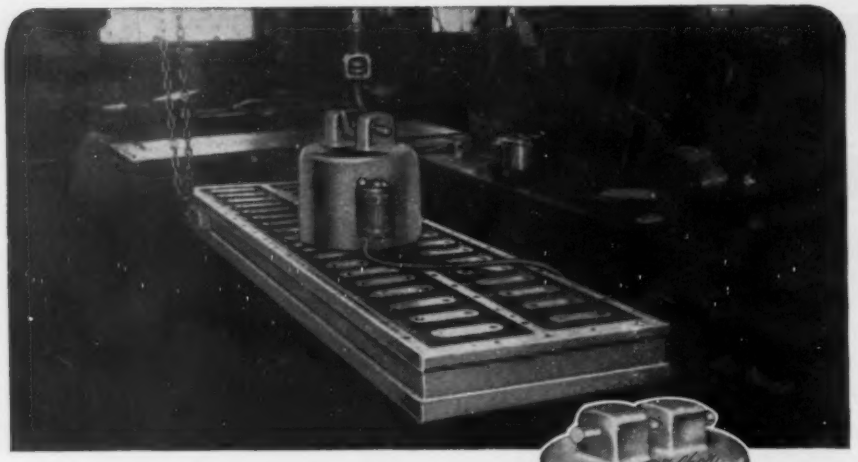
Your inquiry is invited . . .

Produced for Eli Lilly and Co.—all-gold decoration of Florence Nightingale distributed in observance of hospital week.

1st 1952

THE MEYERCORD CO.
World's Largest Decalcomania Manufacturers

DEPT. J-313
5323 WEST LAKE ST.
CHICAGO 44, ILLINOIS



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This 12″ diameter Walker Lifting Magnet holds work up to 5000 pounds. Highly efficient along production lines for handling all types of work pieces.

The Walker line includes contoured lifting magnets increasing the area of contact for special applications (for wire, pipe, etc.). Your lifting problems can be solved by Walker.

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C-F LIFTER

C-F Lifters, under one man operation, pick up, carry and unload more sheet steel tonnage per hour than any other method – and at lower cost per ton. Wide carrying angles hold sheets securely – won't damage high grade sheets; tong action insures safe carrying; fast opening and closing adjustments of Lifter jaws permit shifting from one size pack to another in seconds. C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons.

Write for Bulletin SL-28 for specific examples of C-F Lifter operation and economy.

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Ferroalloy Prices

(Effective Sept. 1, 1953)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carloads 9.90
Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots $6.40
Less ton lots 6.45

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $4.45

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.12

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.31

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.35

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.30
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B..... .85
14 to 10% B..... 1.30
19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel - Boron, 15-18%, B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots $2.05

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

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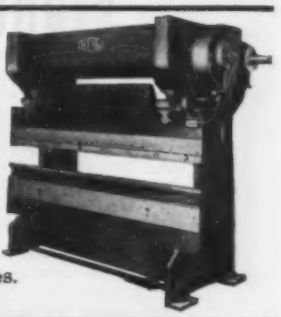

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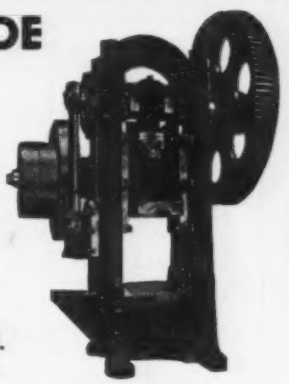
The complete line of efficient Zeh & Hahnemann presses includes straight side presses, either single or double crank, for heavy blanking and forming operations. These are made with either a solid frame or a frame built up with the rods as illustrated. Ask for the Z & H catalog of modern presses.



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Four, Five, Six, Eight Spindles • Work and Tool Rotating Type

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18" x 54" centers MONARCH Lathe, motor in base, taper attachment, chucks
27" x 12' centers LODGE & SHIPLEY Selective Geared Head Lathe, AC-MD
28" x 15' centers BERTRAM (Niles patterns) Timesaver Engine Lathe, 2 carriages, rapid traverse, AC-MD, 1943
36" x 12' centers AMERICAN Heavy Duty 16 Speed Geared Head Lathe, AC-MD
42" x 96" centers NILES Timesaver Heavy Duty Lathe, 42" swing over ways, rapid traverse, anti-friction head, AC-MD
60" x 20' NILES BEMENT POND Geared Head Engine Lathe, rapid traverse
No. 4L GISHOLT Turret Lathe, bar & chuck, new 1945
42" BULLARD Vertical Turret Lathe, extra high column, AC-MD
62" BULLARD Vertical Boring Mill, 2 swivel rail heads, power rapid traverse, AC-MD
No. 2 CINCINNATI Vertical Mill, dial type, new 1945
No. 3 ROCKFORD Combination Vertical & Horizontal Mill, 10 HP, AC-MD
No. 3-24 CINCINNATI Plain Hydromatic Mill, AC-MD
No. 4 KEARNEY & TRECKER Plain Horizontal Mill, No. 50 taper, motor in base, rapid traverse
No. 4 CINCINNATI High Power Vertical Mill, No. 50 taper, power rapid traverse, AC motor
No. 4H KEARNEY & TRECKER Vertical Mill, new 1944
5" bar KEYSTONE Floor Type Horizontal Boring Mill, AC-MD, new 1943
14" x 48" MATTISON Hydraulic Surface Grinder, magnetic chuck, AC motors, 1940
25A HEALD Rotary Surface Grinder, 24" diameter magnetic chuck, AC-MD
1½" LANDIS Bolt Threader, leadscrews, AC-MD
75 Ton HENRY & WRIGHT Double Crank Dieing Machine, roll feed & scrap cutter
600 Ton CHAMBERSBURG Wheel Press, cast steel frame, inclined, AC-MD
30" MORTON, Hydraulic Keyseater, new 1942
48" x 48" x 10' NILES Double Housing Planer, 2 rail heads, 1 side head, power rapid traverse
48" widened to 69" x 12' DETRICK & HARVEY Double Housing Planer, box table, DC reversing motor drive

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The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Use Own Firm . . . On the basis of a year's experience, a Pittsburgh district company is sold on the advantages of operating through its own export company in dealing with non-U. S. accounts in the western hemisphere.

This company, which handles steel mill equipment, formed its export subsidiary under a new law designed to encourage dealings between U. S. companies and firms in Canada and Latin America. The law provides certain advantages, including exemption from excess profits tax, on business of this nature.

Most Deals in Canada . . . Most of the Pittsburgh firm's transactions under the law to date have been with Canadian firms, but some attractive deals have been lined up with Latin American companies as well.

One objection to the law is a provision that in at least 95 pct of deals arranged, title to equipment must pass in the foreign country. In at least one instance, the local company believes it will not be able to follow through on a promising transaction with a Mexican firm through its export company because of the foreign title provision.

Mill Machinery Pickup . . . Generally, activity in steel mill equipment has been picking up. Domestic business is good. One firm added up its figures for the fiscal year ended Aug. 31 and found that overall it had a good year despite several poor months.

Electrical equipment business continues slow. A 2-week flurry of activity involving some export deals was hardly enough to offset poor business otherwise. Coal mine activity is dull.

Wait For Fall . . . Machine tool business is spotty, but to local dealers the future looks better. They blame vacations, plant shutdowns, and inventory-taking for most of their present problems.

One machine tool dealer reports he sent out a list of tools a month ago, but his mail brought few responses. Most of his prospects are unavailable, presumably due to vacations.

Reports from the Pittsburgh area bear out last week's Clearing House statement that the fire at the General Motors Transmission plant at Livonia, Mich., would mean more business for rebuilders and used machinery firms throughout the country. For certain Pittsburgh used equipment dealers who had the required machines and parts needed to replace destroyed or damaged machinery, the fire has proved a blessing.

Some Toolroom Demand . . . Dealers in the New York area are glum about the used machinery market. Some activity in toolroom equipment is reported but production equipment is dead.

Availability of salable used machine tools has still shown no signs of easing and the auction market offers little relief on this problem. One dealer told THE IRON AGE he had been attending used machinery auctions earlier in the year but has stopped going because bids were too high.

Earning Enough? . . . In the August issue of *NISA News*, published by the National Industrial Service Assn., Inc., there is an interesting article on how much profits and management salaries should be for small firms such as are in the electrical repair and used electrical equipment business.

The publication states that the manager of such a firm should earn up to twice as much as his most highly paid employee. After executive salaries and all other overhead expenses have been paid, the profit should be a greater percentage of net worth than the rate of return on public investments. It is suggested that in a healthy business, profit should amount to at least 10 to 15 pct of net worth.